

PCE Working Group
Internet-Draft
Intended status: Standards Track
Expires: August 23, 2013

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February 19, 2013

PCE communication protocol (PCEP) Management Information Base
draft-ietf-pce-pcep-mib-04

Abstract

This memo defines an experimental portion of the Management Information Base for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling of 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 Path Computation Element (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 Path Computation Client (PCC) may make requests to a PCE for paths to be computed.

The PCE communication protocol (PCEP) is the communication protocol between a PCC and PCE for point-to-point (P2P) path computations and is defined in [\[RFC5440\]](#). Such PCEP communication 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.

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

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. 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](#), [RFC 2119](#) [\[RFC2119\]](#).

4. Terminology

The terminology used in this document is built on notions introduced and discussed in PCE WG documents. The reader should be familiar with these documents.

Domain: any collection of network elements within a common sphere of address management or path computational responsibility.

IGP Area: OSPF Area or ISIS level/area.

This document also uses the terminology defined in [[RFC4655](#)] and [[RFC5440](#)].

[5.](#) PCEP MIB Module Architecture

The PCEP MIB contains the following information:

- a. PCEP entity status.
- b. PCEP peer information.
- c. PCEP session information.
- d. Notifications to indicate PCEP session changes.

[5.1.](#) Relations to other MIB modules

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

- o InetAddressType
- o InetAddress
- o InetPortNumber

PCEP relies on existing protocols which 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.

[6.](#) Object Definitions

[6.1.](#) 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
        "201302191400Z" -- 19 February 2013
    ORGANIZATION
        "IETF Path Computation Element (PCE) Working Group"
    CONTACT-INFO
        "Email: pce@ietf.org
        WG charter:
            http://www.ietf.org/html.charters/pce-charter.html"

    DESCRIPTION
        "This MIB module defines a collection of objects for managing
        PCE communication protocol (PCEP).

        Copyright (C) The IETF Trust (2013). This version of this
        MIB module is part of RFC YYYY; see the RFC itself for full
        legal notices."
-- RFC Ed.: replace YYYY with actual RFC number & remove this note
    REVISION
        "201302191400Z" -- 19 February 2013
    DESCRIPTION
        "Initial version, published as RFC YYYY."
-- RFC Ed.: replace YYYY with actual RFC number & remove this note
        ::= { mib-2 XXX }
-- RFC Ed.: replace XXX with IANA-assigned number & remove this note

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

--
-- PCE Entity Objects
--
```

```
pcePcepEntityTable OBJECT-TYPE
    SYNTAX      SEQUENCE OF PcePcepEntityEntry
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "This table contains information about the PCEP Entity."
    ::= { pcePcepEntityObjects 1 }

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

PcePcepEntityEntry ::= SEQUENCE {
    pcePcepEntityIndex          Unsigned32,
    pcePcepEntityAdminStatus    INTEGER,
    pcePcepEntityOperStatus     INTEGER,
    pcePcepEntityAddrType       InetAddressType,
    pcePcepEntityAddr           InetAddress,
    pcePcepEntityConnectTimer   Unsigned32,
    pcePcepEntityOpenWaitTimer  Unsigned32,
    pcePcepEntityKeepWaitTimer  Unsigned32,
    pcePcepEntityKeepAliveTimer Unsigned32,
    pcePcepEntityDeadTimer      Unsigned32,
    pcePcepEntityMaxKeepAliveTimer Unsigned32,
    pcePcepEntityMaxDeadTimer   Unsigned32,
    pcePcepEntityAllowNegotiation TruthValue,
    pcePcepEntityMinKeepAliveTimer Unsigned32,
    pcePcepEntityMinDeadTimer   Unsigned32,
    pcePcepEntitySyncTimer      Unsigned32,
    pcePcepEntityRequestTimer    Unsigned32,
    pcePcepEntityInitBackoffTimer Unsigned32,
    pcePcepEntityMaxBackoffTimer Unsigned32,
    pcePcepEntityMaxSessions     Unsigned32,
    pcePcepEntityMaxUnknownReqs  Unsigned32,
    pcePcepEntityMaxUnknownMsgs  Unsigned32
}

pcePcepEntityIndex OBJECT-TYPE
    SYNTAX      Unsigned32 (1..2147483647)
    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."
    ::= { pcePcepEntityEntry 2 }

pcePcepEntityOperStatus OBJECT-TYPE
    SYNTAX      INTEGER {
                    operStatusUp(1),           -- active
                    operStatusDown(2),         -- inactive
                    operStatusGoingUp(3),      -- activating
                    operStatusGoingDown(4),    -- deactivating
                    operStatusFailed(5),        -- failed, will recover
                                                -- when possible
                    operStatusFailedPerm(6)    -- operator intervention
                                                -- required
                }
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The operational status of the PCEP entity."
    ::= { 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 pcePcepPeerAddr object should
         be interpreted."
    ::= { pcePcepEntityEntry 4 }

pcePcepEntityAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS   read-only
    STATUS       current
    DESCRIPTION
        "The 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."

::= { 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 PCEP peer. If a TCP connection is not established within this time then PCEP aborts the session setup attempt."

::= { pcePcepEntityEntry 6 }

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 PCEP peer. If no Open message is received within this time then PCEP aborts the session setup attempt."

::= { pcePcepEntityEntry 7 }

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 PCEP peer during session initialization. If no Keepalive or PCErr message is received within this time then PCEP aborts the session setup attempt."

::= { pcePcepEntityEntry 8 }

pcePcepEntityKeepAliveTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The keep alive 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 PCEP 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 PCEP 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 9 }

pcePcepEntityDeadTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The dead timer 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 PCEP peer should declare a session down if it does not receive any PCEP messages.

pcePcepEntityDeadTimer is recommended to be 4 times the pcePcepEntityKeepAliveTimer value. Zero means suggesting that the peer does not run a dead timer at all; it is only allowed when pcePcepEntityKeepAliveTimer is also zero."

::= { pcePcepEntityEntry 10 }

pcePcepEntityMaxKeepAliveTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"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 11 }

pcePcepEntityMaxDeadTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum value that this PCEP entity will accept from a peer for the Dead timer. Zero means that the PCEP entity will allow not running a Dead timer.

A Dead timer will not be accepted unless it is both greater than the session Keepalive timer and less than this field."

::= { pcePcepEntityEntry 12 }

pcePcepEntityAllowNegotiation OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Whether the PCEP entity will permit negotiation of session parameters."

::= { pcePcepEntityEntry 13 }

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 14 }

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 Dead timer. Zero means that the PCEP entity insists on not running a Dead timer.

A Dead timer will not be accepted unless it is both greater than the session Keepalive timer and greater than this field."

::= { pcePcepEntityEntry 15 }

pcePcepEntitySyncTimer OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of SYNC timer is used in the case of 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 SYNC timer 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 reasons (for example, a misbehaving PCC)."

::= { pcePcepEntityEntry 16 }

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 17 }

pcePcepEntityInitBackoffTimer OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The initial back-off time for retrying a failed session setup attempt to a peer.

The back-off time increases for each failed session setup attempt, until a maximum back-off time is reached. The maximum back-off time is pcePcepEntityMaxBackoffTimer."

::= { pcePcepEntityEntry 18 }

pcePcepEntityMaxBackoffTimer OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-only

```
STATUS      current
DESCRIPTION
    "The maximum back-off time for retrying a failed session
    setup attempt to a peer.

    The back-off time increases for each failed session setup
    attempt, until this maximum value is reached. Session
    setup attempts then repeat periodically without any
    further increase in back-off time."
 ::= { pcePcepEntityEntry 19 }

pcePcepEntityMaxSessions OBJECT-TYPE
    SYNTAX      Unsigned32
    MAX-ACCESS   read-only
    STATUS      current
    DESCRIPTION
        "Maximum number of sessions involving this PCEP entity
        that can exist at any time."
    ::= { pcePcepEntityEntry 20 }

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.

        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 21 }

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."
    ::= { pcePcepEntityEntry 22 }

--
-- The PCEP Peer Table
```

--

pcePcepPeerObjects OBJECT IDENTIFIER ::= { pcePcepMIBObjects 2 }

pcePcepPeerTable OBJECT-TYPE

SYNTAX SEQUENCE OF PcePcepPeerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about PCEP peers known by the local PCEP speaker.

This MIB table gives PCEP peer information that spans PCEP sessions. Information about current PCEP sessions can be found in the pcePcepSessTable MIB table."

::= { pcePcepPeerObjects 1 }

pcePcepPeerEntry OBJECT-TYPE

SYNTAX PcePcepPeerEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"Information about a single PCEP peer which spans all PCEP sessions to that peer. The information contained in a row is read-only."

INDEX { pcePcepEntityIndex,
pcePcepPeerAddrType,
pcePcepPeerAddr }

::= { pcePcepPeerTable 1 }

PcePcepPeerEntry ::= SEQUENCE {

pcePcepPeerAddrType	InetAddressType,
pcePcepPeerAddr	InetAddress,
pcePcepPeerDiscontinuityTime	TimeStamp,
pcePcepPeerInitiateSession	TruthValue,
pcePcepPeerSessionExists	TruthValue,
pcePcepPeerNumSessSetupOK	Counter32,
pcePcepPeerNumSessSetupFail	Counter32,
pcePcepPeerSessionUpTime	TimeStamp,
pcePcepPeerSessionFailTime	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,
    pcePcepPeerNumReqSent             Counter32,
    pcePcepPeerNumSvecSent            Counter32,
    pcePcepPeerNumReqSentPendRep      Counter32,
    pcePcepPeerNumReqSentEroRcvd      Counter32,
    pcePcepPeerNumReqSentNoPathRcvd   Counter32,
    pcePcepPeerNumReqSentCancelRcvd   Counter32,
    pcePcepPeerNumReqSentErrorRcvd    Counter32,
    pcePcepPeerNumReqSentTimeout      Counter32,
    pcePcepPeerNumReqSentCancelSent   Counter32,
    pcePcepPeerNumReqSentClosed       Counter32,
    pcePcepPeerNumReqRcvd             Counter32,
    pcePcepPeerNumSvecRcvd            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 peer Internet address type (IPv4 or IPv6).

        This specifies how pcePcepPeerAddr should be interpreted."
    ::= { pcePcepPeerEntry 1 }

pcePcepPeerAddr OBJECT-TYPE
    SYNTAX      InetAddress (SIZE (4..32))
    MAX-ACCESS  not-accessible
    STATUS      current
    DESCRIPTION
        "The Internet address of the peer.

        The type of this address is specified by
        pcePcepPeerAddrType. "

```

```
::= { pcePcepPeerEntry 2 }
```

```
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 3 }
```

```
pcePcepPeerInitiateSession OBJECT-TYPE
```

```
SYNTAX      TruthValue
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Indicates whether the PCEP Entity initiates sessions to this  
    peer, or waits for the peer to initiate a session."
```

```
::= { pcePcepPeerEntry 4 }
```

```
pcePcepPeerSessionExists OBJECT-TYPE
```

```
SYNTAX      TruthValue
```

```
MAX-ACCESS  read-only
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Indicates whether a session with this peer currently  
    exists."
```

```
::= { pcePcepPeerEntry 5 }
```

```
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."
```

```
::= { pcePcepPeerEntry 6 }
```

```
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 reaching session state  
    pceSessionUp."
```

```
::= { pcePcepPeerEntry 7 }
```

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 8 }

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 9 }

pcePcepPeerAvgRspTime OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

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."

::= { pcePcepPeerEntry 10 }

pcePcepPeerLWMRspTime OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

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."

::= { pcePcepPeerEntry 11 }

pcePcepPeerHWMRspTime OBJECT-TYPE
SYNTAX Unsigned32 (1..65535)
UNITS "seconds"
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."
 ::= { pcePcepPeerEntry 12 }

pcePcepPeerNumPCReqSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of PCReq messages sent to this peer."
 ::= { pcePcepPeerEntry 13 }

pcePcepPeerNumPCReqRcvd OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of PCReq messages received from this peer."
 ::= { pcePcepPeerEntry 14 }

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

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

pcePcepPeerNumPCErrSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only

```
STATUS      current
DESCRIPTION
    "The number of PCErr messages sent to this peer."
 ::= { pcePcepPeerEntry 17 }

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

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

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

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

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

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

STATUS current
DESCRIPTION
"The number of unknown messages received from this peer."
::= { pcePcepPeerEntry 23 }

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 24 }

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 25 }

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 26 }

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 object was received. Such responses indicate that a path was successfully computed by the peer."
::= { pcePcepPeerEntry 27 }

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 28 }

pcePcepPeerNumReqSentCancelRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of requests that were cancelled 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 29 }

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 30 }

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 31 }

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 speaker sending a
    PCNtf."
 ::= { pcePcepPeerEntry 32 }

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 33 }

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 34 }

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 35 }

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 36 }

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 object was sent. Such responses indicate that a path was successfully computed by the local PCEP speaker."

::= { pcePcepPeerEntry 37 }

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 speaker could not find a path to satisfy the request."

::= { pcePcepPeerEntry 38 }

pcePcepPeerNumReqRcvdCancelSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of requests received from this peer that were cancelled by the local PCEP speaker 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 39 }

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 speaker 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 40 }

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 41 }

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 42 }

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 43 }

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 44 }

--
-- The PCEP Sessions Table
--

pcePcepSessObjects OBJECT IDENTIFIER ::= { pcePcepMIBObjects 3 }
```

pcePcepSessTable OBJECT-TYPE

SYNTAX SEQUENCE OF PcePcepSessEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"A table of PCEP sessions that involve the local PCEP speaker. Each row in this table represents a single session."

::= { pcePcepSessObjects 1 }

pcePcepSessEntry OBJECT-TYPE

SYNTAX PcePcepSessEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table represents a single PCEP session in which the local PCEP speaker participates."

An entry in this table exists only if the corresponding PCEP session has been initialized by some event, such as manual user configuration, autodiscovery of a peer, or an incoming TCP connection.

An entry appears in this table when the corresponding PCEP session transitions out of idle state. If the PCEP session transitions back into idle state then the corresponding entry in this table is removed."

INDEX { pcePcepEntityIndex,
pcePcepPeerAddrType,
pcePcepPeerAddr,
pcePcepSessInitiator }

::= { pcePcepSessTable 1 }

PcePcepSessEntry ::= SEQUENCE {

pcePcepSessInitiator	INTEGER,
pcePcepSessStateLastChange	TimeStamp,
pcePcepSessState	INTEGER,
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,
pcePcepSessNumReqSent              Counter32,
pcePcepSessNumSvecSent              Counter32,
pcePcepSessNumReqSentPendRep        Counter32,
pcePcepSessNumReqSentEroRcvd        Counter32,
pcePcepSessNumReqSentNoPathRcvd     Counter32,
pcePcepSessNumReqSentCancelRcvd     Counter32,
pcePcepSessNumReqSentErrorRcvd      Counter32,
pcePcepSessNumReqSentTimeout        Counter32,
pcePcepSessNumReqSentCancelSent     Counter32,
pcePcepSessNumReqRcvd              Counter32,
pcePcepSessNumSvecRcvd              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 speaker or the
        remote PCEP speaker."

```

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 the MIB. The sessions are distinguished by who initiated them, and so this field is an index for the 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 }

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 speaker 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 4 }

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 5 }

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 speaker transmits PCEP messages on this PCEP session. Zero means that the local PCEP speaker 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 6 }

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 7 }

pcePcepSessDeadTimer OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION
 "The local PCEP speaker's DeadTimer interval for this PCEP session."
 ::= { pcePcepSessEntry 8 }

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

 If pcePcepSessState is tcpPending or openWait then this field is not used and MUST be set to zero."
 ::= { pcePcepSessEntry 9 }

pcePcepSessKAHoldTimeRem OBJECT-TYPE
SYNTAX Unsigned32 (0..255)
UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The keep alive 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 10 }

pcePcepSessOverloaded OBJECT-TYPE
SYNTAX TruthValue
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "If the local PCEP speaker has informed the peer that it is currently overloaded, then this is set to true. Otherwise, it is set to false."
 ::= { pcePcepSessEntry 11 }

pcePcepSessOverloadTime OBJECT-TYPE
SYNTAX Unsigned32
UNITS "seconds"
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The interval of time until the local PCEP speaker 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 12 }

pcePcepSessPeerOverloaded OBJECT-TYPE

SYNTAX TruthValue

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If the peer has informed the local PCEP speaker that it is currently overloaded, then this is set to true. Otherwise, it is set to false."

::= { pcePcepSessEntry 13 }

pcePcepSessPeerOverloadTime OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The interval of time 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 14 }

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 15 }

pcePcepSessAvgRspTime OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

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 16 }

pcePcepSessLWMRspTime OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

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 17 }

pcePcepSessHWMRspTime OBJECT-TYPE

SYNTAX Unsigned32 (1..65535)

UNITS "seconds"

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 18 }

pcePcepSessNumPCReqSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCReq messages sent on this session."

::= { pcePcepSessEntry 19 }

pcePcepSessNumPCReqRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCReq messages received on this session."

::= { pcePcepSessEntry 20 }

pcePcepSessNumPCRepSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCRep messages sent on this session."

::= { pcePcepSessEntry 21 }

pcePcepSessNumPCRepRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCRep messages received on this session."

::= { pcePcepSessEntry 22 }

pcePcepSessNumPCErrSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCErr messages sent on this session."

::= { pcePcepSessEntry 23 }

pcePcepSessNumPCErrRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCErr messages received on this session."

::= { pcePcepSessEntry 24 }

pcePcepSessNumPCNtfSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCNtf messages sent on this session."

::= { pcePcepSessEntry 25 }

pcePcepSessNumPCNtfRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCNtf messages received on this session."

::= { pcePcepSessEntry 26 }

pcePcepSessNumKeepaliveSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Keepalive messages sent on this session."

::= { pcePcepSessEntry 27 }

pcePcepSessNumKeepaliveRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of Keepalive messages received on this session."

::= { pcePcepSessEntry 28 }

pcePcepSessNumUnknownRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of unknown messages received on this session."

::= { pcePcepSessEntry 29 }

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 30 }

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 31 }

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 32 }

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 33 }

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 34 }

pcePcepSessNumReqSentCancelRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of requests sent on this session that were cancelled 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 35 }

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 36 }

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 37 }

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 speaker sending a PCNtf."

::= { pcePcepSessEntry 38 }

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 39 }

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 40 }

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 41 }

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 42 }

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 43 }

pcePcepSessNumReqRcvdCancelSent OBJECT-TYPE
SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "The number of requests received on this session that were
    cancelled by the local PCEP speaker 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 44 }

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 speaker 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 45 }

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 46 }

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 47 }

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 48 }

--- 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 }

--
-- 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
        }
    ::= { pcePcepCompliances 1 }

-- units of conformance

pcePcepGeneralGroup OBJECT-GROUP
    OBJECTS { pcePcepEntityAdminStatus,
```

pcePcepEntityOperStatus,
pcePcepEntityAddrType,
pcePcepEntityAddr,
pcePcepEntityConnectTimer,
pcePcepEntityOpenWaitTimer,
pcePcepEntityKeepWaitTimer,
pcePcepEntityKeepAliveTimer,
pcePcepEntityDeadTimer,
pcePcepEntityMaxKeepAliveTimer,
pcePcepEntityMaxDeadTimer,
pcePcepEntityAllowNegotiation,
pcePcepEntityMinKeepAliveTimer,
pcePcepEntityMinDeadTimer,
pcePcepEntitySyncTimer,
pcePcepEntityRequestTimer,
pcePcepEntityInitBackoffTimer,
pcePcepEntityMaxBackoffTimer,
pcePcepEntityMaxSessions,
pcePcepEntityMaxUnknownReqs,
pcePcepEntityMaxUnknownMsgs,
pcePcepPeerDiscontinuityTime,
pcePcepPeerInitiateSession,
pcePcepPeerSessionExists,
pcePcepPeerNumSessSetupOK,
pcePcepPeerNumSessSetupFail,
pcePcepPeerSessionUpTime,
pcePcepPeerSessionFailTime,
pcePcepPeerAvgRspTime,
pcePcepPeerLWMRspTime,
pcePcepPeerHWMRspTime,
pcePcepPeerNumPCReqSent,
pcePcepPeerNumPCReqRcvd,
pcePcepPeerNumPCRepSent,
pcePcepPeerNumPCRepRcvd,
pcePcepPeerNumPCErrSent,
pcePcepPeerNumPCErrRcvd,
pcePcepPeerNumPCNtfSent,
pcePcepPeerNumPCNtfRcvd,
pcePcepPeerNumKeepaliveSent,
pcePcepPeerNumKeepaliveRcvd,
pcePcepPeerNumUnknownRcvd,
pcePcepPeerNumReqSent,
pcePcepPeerNumSvecSent,
pcePcepPeerNumReqSentPendRep,
pcePcepPeerNumReqSentEroRcvd,
pcePcepPeerNumReqSentNoPathRcvd,
pcePcepPeerNumReqSentCancelRcvd,
pcePcepPeerNumReqSentErrorRcvd,

pcePcepPeerNumReqSentTimeout,
pcePcepPeerNumReqSentCancelSent,
pcePcepPeerNumReqSentClosed,
pcePcepPeerNumReqRcvd,
pcePcepPeerNumSvecRcvd,
pcePcepPeerNumReqRcvdPendRep,
pcePcepPeerNumReqRcvdEroSent,
pcePcepPeerNumReqRcvdNoPathSent,
pcePcepPeerNumReqRcvdCancelSent,
pcePcepPeerNumReqRcvdErrorSent,
pcePcepPeerNumReqRcvdCancelRcvd,
pcePcepPeerNumReqRcvdClosed,
pcePcepPeerNumRepRcvdUnknown,
pcePcepPeerNumReqRcvdUnknown,
pcePcepSessStateLastChange,
pcePcepSessState,
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,
pcePcepSessNumReqSent,
pcePcepSessNumSvecSent,
pcePcepSessNumReqSentPendRep,
pcePcepSessNumReqSentEroRcvd,
pcePcepSessNumReqSentNoPathRcvd,
pcePcepSessNumReqSentCancelRcvd,

```

        pcePcepSessNumReqSentErrorRcvd,
        pcePcepSessNumReqSentTimeout,
        pcePcepSessNumReqSentCancelSent,
        pcePcepSessNumReqRcvd,
        pcePcepSessNumSvecRcvd,
        pcePcepSessNumReqRcvdPendRep,
        pcePcepSessNumReqRcvdEroSent,
        pcePcepSessNumReqRcvdNoPathSent,
        pcePcepSessNumReqRcvdCancelSent,
        pcePcepSessNumReqRcvdErrorSent,
        pcePcepSessNumReqRcvdCancelRcvd,
        pcePcepSessNumRepRcvdUnknown,
        pcePcepSessNumReqRcvdUnknown
    }
    STATUS current
    DESCRIPTION
        "Objects that apply to all PCEP MIB implementations."
    ::= { pcePcepGroups 1 }

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

END

```

7. Security Considerations

The readable objects in the PCE-PCEP-MIB module (i.e., those with MAX-ACCESS other than not-accessible) may be considered sensitive in some environments since, collectively, they provide information about the amount and frequency of path computation requests and responses within the network and can reveal some aspects of their configuration.

In such environments it is important to control also GET and NOTIFY access to these objects and possibly even to encrypt their values when sending them over the network via SNMP.

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

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

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

[8.](#) 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 XXX }

Editor's Note (to be removed prior to publication): the IANA is requested to assign a value for "XXX" under the 'mib-2' subtree and to record the assignment in the SMI Numbers registry. When the assignment has been made, the RFC Editor is asked to replace "XXX" (here and in the MIB module) with the assigned value and to remove this note.

[9.](#) References

[9.1.](#) Normative References

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- [RFC5440] Vasseur, JP. and JL. Le Roux, "Path Computation Element (PCE) Communication Protocol (PCEP)", [RFC 5440](#), March 2009.

[9.2.](#) Normative References

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

[Appendix A.](#) Acknowledgement

The authors would like to thank Santanu Mazumder and Meral Shirazipour for their valuable input.

Funding for the RFC Editor function is currently provided by the Internet Society.

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