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**PCE communication protocol (PCEP) Management Information Base
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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

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
        "201307152200Z" -- 15 July 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
        "201307152200Z" -- 15 July 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,
    pcePcepEntityConnectMaxRetry 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 }

pcePcepEntityConnectMaxRetry OBJECT-TYPE

SYNTAX Unsigned32

UNITS "seconds"

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The maximum number of times the system tries to establish a TCP connection to a peer before going back to the Idle state."

::= { pcePcepEntityEntry 7 }

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 8 }

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 9 }
```

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 10 }
```

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 11 }
```

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 12 }

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 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 }

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 15 }

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 16 }

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 17 }

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 18 }

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 19 }
```

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 20 }
```

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 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.

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."
 ::= { pcePcepEntityEntry 23 }

--
-- 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,
    pcePcepPeerRole          INTEGER,
    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,
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 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 }

pcePcepPeerRole OBJECT-TYPE

SYNTAX INTEGER {

pcc(1), -- Path Computation Client (PCC)

pce(2), -- Path Computation Server (PCE)

pccAndPce(3), -- Both PCC and PCE roles

unknown(4) -- Peer role is unknown

}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The role that this peer took the last time a session was
established."

::= { 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.

sysUpTime is the time (in hundredths of a second) since the
network management portion of the system was last
re-initialized. It is defined in [RFC 1907](#)."

::= { pcePcepPeerEntry 4 }

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 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 with this peer fails before reaching session state pceSessionUp."

```
::= { 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 }

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.

If pcePcepPeerRole is pcc then this field is meaningless and is set to zero."

::= { pcePcepPeerEntry 11 }

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.

If pcePcepPeerRole is pcc then this field is meaningless and is set to zero."

::= { pcePcepPeerEntry 12 }

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.

If pcePcepPeerRole is pcc then this field is meaningless and is set to zero."

::= { pcePcepPeerEntry 13 }

pcePcepPeerNumPCReqSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCReq messages sent to this peer."

::= { pcePcepPeerEntry 14 }

pcePcepPeerNumPCReqRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCReq messages received from this peer."

::= { pcePcepPeerEntry 15 }

pcePcepPeerNumPCRepSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCRep messages sent to this peer."

::= { pcePcepPeerEntry 16 }

pcePcepPeerNumPCRepRcvd OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCRep messages received from this peer."

::= { pcePcepPeerEntry 17 }

pcePcepPeerNumPCErrSent OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The number of PCErr messages sent to this peer."

::= { pcePcepPeerEntry 18 }

pcePcepPeerNumPCErrRcvd OBJECT-TYPE

SYNTAX Counter32
MAX-ACCESS read-only
STATUS current
DESCRIPTION
 "The number of PCErr messages received from this peer."
 ::= { pcePcepPeerEntry 19 }

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

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

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

pcePcepPeerNumKeepaliveRcvd OBJECT-TYPE
 SYNTAX Counter32
 MAX-ACCESS read-only
 STATUS current
 DESCRIPTION
 "The number of Keepalive messages received from this peer."
 ::= { pcePcepPeerEntry 23 }

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

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 25 }

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 26 }

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 27 }

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 28 }

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 29 }

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 30 }

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 31 }

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 32 }

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 33 }
```

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 34 }
```

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 35 }
```

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 36 }
```

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 37 }
```

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 38 }

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 39 }

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 40 }

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 41 }

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 42 }
```

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 43 }
```

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 44 }
```

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 45 }
```

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 46 }
```

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 47 }

--
-- 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,
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,
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 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

entiries 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 speaker has attempted to establish a TCP connection for this session without success. The PCEP speaker 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 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 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 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 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 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 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 11 }

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 12 }

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 13 }

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 14 }

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 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 (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 17 }

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 18 }

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 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 }

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 31 }

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 32 }

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 33 }

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 34 }

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 35 }
```

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 36 }
```

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 37 }
```

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 38 }
```

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 39 }
```


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 40 }

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 41 }

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 42 }

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 43 }

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 44 }

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 45 }

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 46 }

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 47 }

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 48 }

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 49 }

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 50 }

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 51 }

--- 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 speaker enters
     overload state for a peer."
    ::= { pcePcepNotifications 3 }

pcePcepSessLocalOverloadClear NOTIFICATION-TYPE
  OBJECTS      {
                pcePcepSessOverloaded
              }
  STATUS       current
  DESCRIPTION
    "This notification is sent when the local PCEP speaker 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
        }
    ::= { pcePcepCompliances 1 }

-- units of conformance

pcePcepGeneralGroup OBJECT-GROUP
    OBJECTS { pcePcepEntityAdminStatus,
              pcePcepEntityOperStatus,
              pcePcepEntityAddrType,
              pcePcepEntityAddr,
              pcePcepEntityConnectTimer,
              pcePcepEntityConnectMaxRetry,
              pcePcepEntityOpenWaitTimer,
              pcePcepEntityKeepWaitTimer,
              pcePcepEntityKeepAliveTimer,
              pcePcepEntityDeadTimer,
              pcePcepEntityMaxKeepAliveTimer,
              pcePcepEntityMaxDeadTimer,
```


pcePcepEntityAllowNegotiation,
pcePcepEntityMinKeepAliveTimer,
pcePcepEntityMinDeadTimer,
pcePcepEntitySyncTimer,
pcePcepEntityRequestTimer,
pcePcepEntityInitBackoffTimer,
pcePcepEntityMaxBackoffTimer,
pcePcepEntityMaxSessions,
pcePcepEntityMaxUnknownReqs,
pcePcepEntityMaxUnknownMsgs,
pcePcepPeerRole,
pcePcepPeerDiscontinuityTime,
pcePcepPeerInitiateSession,
pcePcepPeerSessionExists,
pcePcepPeerNumSessSetupOK,
pcePcepPeerNumSessSetupFail,
pcePcepPeerSessionUpTime,
pcePcepPeerSessionFailTime,
pcePcepPeerAvgRspTime,
pcePcepPeerLWMRspTime,
pcePcepPeerHWMRspTime,
pcePcepPeerNumPCReqSent,
pcePcepPeerNumPCReqRcvd,
pcePcepPeerNumPCRepSent,
pcePcepPeerNumPCRepRcvd,
pcePcepPeerNumPCErrSent,
pcePcepPeerNumPCErrRcvd,
pcePcepPeerNumPCNtfSent,
pcePcepPeerNumPCNtfRcvd,
pcePcepPeerNumKeepaliveSent,
pcePcepPeerNumKeepaliveRcvd,
pcePcepPeerNumUnknownRcvd,
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,
pcePcepSessNumReqSent,
pcePcepSessNumSvecSent,
pcePcepSessNumSvecReqSent,
pcePcepSessNumReqSentPendRep,
pcePcepSessNumReqSentEroRcvd,
pcePcepSessNumReqSentNoPathRcvd,
pcePcepSessNumReqSentCancelRcvd,
pcePcepSessNumReqSentErrorRcvd,
pcePcepSessNumReqSentTimeout,
pcePcepSessNumReqSentCancelSent,
pcePcepSessNumReqRcvd,
pcePcepSessNumSvecRcvd,


```
        pcePcepSessNumSvecReqRcvd,
        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,
                    pcePcepSessLocalOverload,
                    pcePcepSessLocalOverloadClear,
                    pcePcepSessPeerOverload,
                    pcePcepSessPeerOverloadClear
    }
    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. Contributors

Thanks to Dhruv Dhody for contributing the P2MP objects, and for his detailed review.

10. References

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[10.2.](#) Normative References

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[Appendix A.](#) Acknowledgement

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