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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.

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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,
```

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```
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."

```

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

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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

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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

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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

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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 }

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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

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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

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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

```

        "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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- [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

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