Management Information Base for the PCE Communications Protocol (PCEP) When Requesting Point-to-Multipoint Services
draft-zhao-pce-pcep-p2mp-mib-05

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 the Path Computation Element communication Protocol (PCEP) for communications between a Path Computation Client (PCC) and a Path Computation Element (PCE), or between two PCEs when point-to-multipoint services are requested.

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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.

A P2MP LSP is comprised of multiple source-to-leaf (S2L) sub-LSPs. These S2L sub-LSPs are set up between ingress and egress LSRs and are appropriately combined by the branch LSRs using computation results from the PCE to determine the path of a P2MP TE LSP.

The Path Computation Element communication Protocol (PCEP) is designed as a communication protocol between PCCs and PCEs for point-to-point (P2P) path computations and is defined in [RFC5440]. [RFC6006] explains how to extend the PCEP protocol for P2MP scenario.

[PCE-PCEP-DRAFT-MIB] defines a portion of the Management Information Base (MIB) for use with network management protocols in the Internet community for P2P path computations.

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) [RFC5440] for communications between a Path Computation Client (PCC) and a Path Computation Element (PCE), or between two PCEs in P2MP scenarios.

Some objects maybe moved to [PCE-PCEP-DRAFT-MIB] after consensus with the authors and working group, these are defined in Section 6.2.

2. Terminology

The following terminology is used in this document.

Domain: Any collection of network elements within a common sphere of address management or path computational responsibility. Examples of domains include Interior Gateway Protocol (IGP) areas and Autonomous Systems (ASs).

LSP: Label Switched Path.

MIB: Management Information Base.

PCC: Path Computation Client: any client application requesting a path computation to be performed by a Path Computation Element.

PCE: Path Computation Element. An entity (component, application, or network node) that is capable of computing a network path or route based on a network graph and applying computational constraints.


P2MP: Point-to-Multipoint.

P2P: Point-to-Point.

SMI: Structure of Management Information.


3. 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 [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] and STD 58, RFC 2580 [RFC2580].

4. PCEP P2MP MIB Module Architecture

The PCEP P2MP MIB is just an extension of the existing architecture defined in [PCE-PCEP-DRAFT-MIB] by adding additional objects which are either common to P2P and P2MP or which are specific to P2MP. All these new objects are added into the two new tables (pcePcepExtSessionTable and pcePcepExtClientTable) defined in this new MIB module. The relationship among the two new tables to the two existing tables in [PCE-PCEP-DRAFT-MIB] are shown in the following figure:
An arrow in the figure above shows that the MIB table pointed from contains a reference to the MIB table pointed to.

5. Example of the PCEP P2MP MIB module usage

In this section we provide an example (pcePcepExtClientTable 1) of using the MIB objects described in Section 6 to monitor. While this example is not meant to illustrate every permutation of the MIB, it is intended as an aid to understanding some of the key concepts. It is meant to be read after going through the MIB itself.

pcePcepExtClientTable 1 of the PCE-PCEP-P2MP-DRAFT-MIB module:

```plaintext
{ pcePcepClientP2mpCapabilityStatus enable(1),
  pcePcepClientOverloadStatus resumed(2),
  pcePcepClientOverloadDuration (10),
}
```

6. Object definitions

6.1. PCE-PCEP-P2MP-DRAFT-MIB

This MIB module makes references to the following documents.

[RFC2578], [RFC2580], [RFC3411], [RFC2863], [RFC3813], [PCE-PCEP-DRAFT-MIB].

PCE-PCEP-P2MP-DRAFT-MIB DEFINITIONS ::= BEGIN

IMPORTS
  MODULE-IDENTITY, OBJECT-TYPE,
  Unsigned32,
  Counter32,
  experimental
  FROM SNMPv2-SMI -- [RFC2578]

  pcePcepClientPcepId, pcePcepClientIndex,
  pcePcepPeerPcepId
  FROM PCE-PCEP-DRAFT-MIB

  MODULE-COMPLIANCE,
  OBJECT-GROUP,
  FROM SNMPv2-CONF; -- [RFC2580]
pcePcepP2mpDraftMIB MODULE-IDENTITY
LAST-UPDATED "201208171200Z" -- Aug 17, 2012
ORGANIZATION "Path Computation Element (PCE) Working Group"
CONTACT-INFO "
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EMail comments directly to the PCE WG Mailing List at pce@ietf.org
WG-URL: http://www.ietf.org/html.charters/pce-charter.html"

DESCRIPTION

"This extended MIB module defines a collection of objects for managing PCE communication protocol (PCEP) when point-to-multipoint services are requested"

-- Revision history
REVISION
"201208171200Z" -- 17 Aug 2012 12:00:00 EST
DESCRIPTION
"
Main Changes from -04 draft :
1. Editorial Changes.

REVISION
"201202221200Z" -- 22 Feb 2012 12:00:00 EST
DESCRIPTION
"
Main Changes from -03 draft :
1. Editorial Changes.
2. Updated Contact Information.

REVISION
"201109201200Z" -- 20 Sept 2011 12:00:00 EST
DESCRIPTION
"
Changes from -02 draft :
1. Correction of Unsigned32 to Counter32.
2. Update Email Address of the author(s)

REVISION
"201103211200Z" -- 21 Mar 2011 12:00:00 EST
DESCRIPTION
"Changes from -01 draft:
1. Correction of spelling mistakes in the document.
2. Addition in Terminology section"

REVISION
"201009151200Z" -- 15 Sep 2010 12:00:00 EST
DESCRIPTION
"Changes from -00 draft:
1. Removed pathkey objects as these objects to be made as a new MIB module for pathkey. As per section 6.2 of [RFC5520].
2. Rearrangement of the sections for better understanding
3. Addition of STATUS (optional or mandatory) in the definitions
4. Addition of section 6.2 to gather all objects which may be moved to [PCE-PCEP-DRAFT-MIB]"

REVISION
"201007051200Z" -- July 05 2010 12:00:00 EST
DESCRIPTION

"draft-00 version"
 ::= { experimental 9999 } --

pcePcepExtMIBObjects OBJECT IDENTIFIER ::= { pcePcepExtDraftMIB 0 }
pcePcepExtConformance OBJECT IDENTIFIER ::= { pcePcepExtDraftMIB 1 }
pcePcepExtClientObjects OBJECT IDENTIFIER ::= { pcePcepExtMIBObjects 1 }

--

-- PCE Extended Client Objects
--
pcePcepClientVersionnumber OBJECT-TYPE
SYNTAX   Unsigned32
MAX-ACCESS read-only
STATUS   optional
DESCRIPTION
"The current version number of the PCEP protocol is 1."
::= {  pcePcepExtClientObjects 1 }

pcePcepExtClientTable OBJECT-TYPE
SYNTAX   SEQUENCE OF PcePcepClientEntry
MAX-ACCESS not-accessible
STATUS   current
DESCRIPTION
"This table contains information about the PCEP Client."
::= {  pcePcepExtClientObjects 2 }

PcePcepExtClientEntry OBJECT-TYPE
SYNTAX   PcePcepClientEntry
MAX-ACCESS not-accessible
STATUS   current
DESCRIPTION
"An entry in this table represents a PCEP client. An entry can be created by a
network administrator or by an SNMP agent as instructed by PCEP."

INDEX   {  pcePcepClientPcepId,
            pcePcepClientIndex,
            pcePcepPeerPcepId  }

::= {  pcePcepExtClientTable 1 }

PcePcepExtClientEntry ::= SEQUENCE {
   pcePcepClientP2mpCapabilityStatus       INTEGER,
   pcePcepClientOverloadStatus             INTEGER,
   pcePcepClientOverloadDuration           Unsigned32
}

pcePcepClientP2mpCapabilityStatus OBJECT-TYPE
SYNTAX       INTEGER {enable (1),
                       disable(2)}
MAX-ACCESS   read-only
STATUS       mandatory
DESCRIPTION
"The P2MP capability status of this PCEP client."
::= {  pcePcepExtClientEntry 1 }

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pcePcepClientOverloadStatus OBJECT-TYPE
SYNTAX      INTEGER {  
   overloaded(1),  
   resumed(2)  
  }
MAX-ACCESS read-only
STATUS optional
DESCRIPTION  
"The Overload status of this PCE client."
::= {  pcePcepExtClientEntry 2 }

pcePcepClientOverloadDuration OBJECT-TYPE
SYNTAX      Unsigned32
UNITS "seconds"
MAX-ACCESS read-only
STATUS optional
DESCRIPTION  
"The period of time during which no further request should
be sent to the PCE client. Once this period of time has
elapsed, the PCE client should no longer be considered in
a congested state."
::= {  pcePcepExtClientEntry 3 }

pcePcepExtSessionObjects OBJECT IDENTIFIER ::= { pcePcepExtMIBObjects 2  

--

-- The PCEP Ext Sessions Table

--

pcePcepExtSessionTable OBJECT-TYPE
SYNTAX      SEQUENCE OF pcePcepExtSessionEntry
MAX-ACCESS not-accessible
STATUS      current
DESCRIPTION  
"A table of extended sessions characteristics between
PCEP clients. Each row in this table represents a
single session."
::= { pcePcepExtSessionObjects 1 }
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pcePcepExtSessionEntry  OBJECT-TYPE
SYNTAX                     pcePcepExtSessionEntry
MAX-ACCESS                 not-accessible
STATUS                      current
DESCRIPTION                 "An entry in this table represents information on a single session between two PCEP clients. The information contained in a row is read-only."

 ::=  { pcePcepExtSessionTable 1 }

PcePcepExtSessionEntry ::= SEQUENCE {
  pcePcepSessionP2mpPCReqMessagesSent     Counter32,
  pcePcepSessionP2mpPCRepMessagesSent     Counter32,
  pcePcepSessionP2mpPCReqMessagesReceived Counter32,
  pcePcepSessionP2mpPCRepMessagesReceived Counter32,
  pcePcepSessionP2mpAddLeaves             Counter32,
  pcePcepSessionP2mpRemoveLeaves          Counter32,
  pcePcepSessionP2mpModifyLeaves          Counter32,
  pcePcepSessionP2mpUnchangedLeaves       Counter32,
  pcePcepSessionTotalMessagesSent         Counter32,
  pcePcepSessionOpenMessagesSent          Counter32,
  pcePcepSessionKeepaliveMessagesSent     Counter32,
  pcePcepSessionPCNtfMessagesSent         Counter32,
  pcePcepSessionPCErrMessagesSent         Counter32,
  pcePcepSessionTotalMessagesReceived     Counter32,
  pcePcepSessionOpenMessagesReceived      Counter32,
  pcePcepSessionKeepaliveMessagesReceived Counter32,
  pcePcepSessionPCNtfMessagesReceived     Counter32,
  pcePcepSessionPCErrMessagesReceived     Counter32,
  pcePcepSessionIntraDomainRequest        Counter32,
  pcePcepSessionInterDomainRequest        Counter32,
  pcePcepSessionSuccessComps              Counter32,
  pcePcepSessionNoReply                   Counter32,
  pcePcepSessionSyncronization            Counter32,
  pcePcepSessionReoptimization            Counter32,
  pcePcepSessionFragmentation             Counter32,
  pcePcepSessionP2pPCErrMessagesSent      Counter32,
  pcePcepSessionP2pPCReqMessagesSent      Counter32,
  pcePcepSessionP2pPCRepMessagesSent      Counter32,
  pcePcepSessionP2pPCReqMessagesReceived  Counter32,
  pcePcepSessionP2pPCRepMessagesReceived  Counter32,
}
pcePcepSessionP2mpPCReqMessagesSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2MP Request messages sent on this session."
::= { pcePcepExtSessionEntry 1 }

pcePcepSessionP2mpPCRepMessagesSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2MP Reply messages sent on this session."
::= { pcePcepExtSessionEntry 2 }

pcePcepSessionP2mpPCReqMessagesReceived OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2MP Request messages received on this session."
::= { pcePcepExtSessionEntry 3 }

pcePcepSessionP2mpPCRepMessagesReceived OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2MP Reply messages received on this session."
::= { pcePcepExtSessionEntry 4 }

pcePcepSessionP2mpAddLeaves OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of leaves to be Added (Type1) for the total P2MP requests (PCReq message) received by the PCE."
::= { pcePcepExtSessionEntry 5 }
pcePcepSessionP2mpRemoveLeaves OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of leaves to be Removed (Type2) for the
total P2MP requests (PCReq message) received by the
PCE."
::= { pcePcepExtSessionEntry 6 }

pcePcepSessionP2mpModifyLeaves OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of leaves to be Modified (Type3) for the
total P2MP requests (PCReq message) received by the
PCE."
::= { pcePcepExtSessionEntry 7 }

pcePcepSessionP2mpUnchangedLeaves OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of leaves not to be changed (Type4) for
the total P2MP requests (PCReq message) received
by the PCE."
::= { pcePcepExtSessionEntry 8 }

pcePcepSessionTotalMessagesSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of PCEP messages sent on this
session."
::= { pcePcepExtSessionEntry 9 }

pcePcepSessionOpenMessagesSent OBJECT-TYPE
SYNTAX Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of Open messages sent on this session."
::= { pcePcepExtSessionEntry 10 }
pcePcepSessionKeepaliveMessagesSent OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of Keepalive messages sent on this session."
::= {  pcePcepExtSessionEntry 11 }

pcePcepSessionPCNtfMessagesSent OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of PCNtf messages sent on this session."
::= {  pcePcepExtSessionEntry 12 }

pcePcepSessionPCErrMessagesSent OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of PCErr messages sent on this session."
::= {  pcePcepExtSessionEntry 13 }

pcePcepSessionTotalMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The total number of PCEP messages received on this session."
::= {  pcePcepExtSessionEntry 14 }

pcePcepSessionOpenMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of Open messages received on this session."
::= {  pcePcepExtSessionEntry 15 }
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pcePcepSessionKeepaliveMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
  "The number of Keepalive messages received on this
  session."
 ::= { pcePcepExtSessionEntry 16 }

pcePcepSessionPCNtfMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
  "The number of PCNtf messages received on this
  session."
 ::= { pcePcepExtSessionEntry 17 }

pcePcepSessionPCErrMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
  "The number of PCErr messages received on this
  session."
 ::= { pcePcepExtSessionEntry 18 }

pcePcepSessionIntraDomainRequest OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
  "The number of requests sent for the Intra-Domain
  path computation."
 ::= { pcePcepExtSessionEntry 19 }

pcePcepSessionInterDomainRequest OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
  "The number of requests sent for the Inter-Domain path
  computation."
 ::= { pcePcepExtSessionEntry 20 }
pcePcepSessionSuccessComps OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
"The number of requests which had successful computations. In case of PCC-PCE session, it is core computation value and in case of PCE-PCE session, it is transit computation value."
::= { pcePcepExtSessionEntry 21 }

pcePcepSessionNoReply OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
"The number of requests which had not been replied either success or failure."
::= { pcePcepExtSessionEntry 22 }

pcePcepSessionSyncronization OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
"The number of synchronized path computation requests that can be either dependent or independent."
::= { pcePcepExtSessionEntry 23 }

pcePcepSessionReoptimization OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
"The number of requests for Reoptimization."
::= { pcePcepExtSessionEntry 24 }

pcePcepSessionFragmentation OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS optional
DESCRIPTION
"The number of packets of a PCReq / PCRep message which had been fragmented."
::= { pcePcepExtSessionEntry 25 }
pcePcepSessionP2pPCReqMessagesSent OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2P Request messages sent on this
session."
::= {  pcePcepExtSessionEntry 26 }

pcePcepSessionP2pPCRepMessagesSent OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2P Reply messages sent on this session."
::= {  pcePcepExtSessionEntry 27 }

pcePcepSessionP2pPCReqMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2P PCReq messages received on this
session."
::= {  pcePcepExtSessionEntry 28 }

pcePcepSessionP2pPCRepMessagesReceived OBJECT-TYPE
SYNTAX  Counter32
MAX-ACCESS read-only
STATUS mandatory
DESCRIPTION
"The number of P2P PCRep messages received on this
session."
::= {  pcePcepExtSessionEntry 29 }

--****************************************************************
-- Module Conformance Statement
--****************************************************************

pcePcepExtGroups
   OBJECT IDENTIFIER ::= { pcePcepExtConformance 1 }

pcePcepExtCompliances
   OBJECT IDENTIFIER ::= { pcePcepExtConformance 2 }
pcePcepExtModuleFullCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
"The Module is implemented with support for read-create and read-write. In other words, both monitoring and configuration are available when using this MODULE-COMPLIANCE."

MODULE -- this module
MANDATORY-GROUPS { pcePcepExtGeneralGroup,
                    }
::= { pcePcepExtCompliances 1 }

pcePcepExtModuleReadOnlyCompliance 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 { pcePcepExtGeneralGroup,
                    }
::= { pcePcepExtCompliances 2 }

-- units of conformance
pcePcepExtGeneralGroup OBJECT-GROUP
   OBJECTS {
      pcePcepClientP2mpCapabilityStatus,
      pcePcepSessionP2mpPCReqMessagesSent,
      pcePcepSessionP2mpPCRepMessagesSent,
      pcePcepSessionP2mpPCReqMessagesReceived,
      pcePcepSessionP2mpPCRepMessagesReceived,
      pcePcepSessionP2mpAddLeaves,
      pcePcepSessionP2mpRemoveLeaves,
      pcePcepSessionP2mpModifyLeaves,
      pcePcepSessionP2mpUnchangedLeaves,
      pcePcepSessionTotalMessagesSent,
      pcePcepSessionOpenMessagesSent,
      pcePcepSessionKeepaliveMessagesSent,
      pcePcepSessionPCNtfMessagesSent,
      pcePcepSessionPCErrMessagesSent,
      pcePcepSessionTotalMessagesReceived,
      pcePcepSessionOpenMessagesReceived,
      pcePcepSessionKeepaliveMessagesReceived,
      pcePcepSessionPCNtfMessagesReceived,
      pcePcepSessionPCErrMessagesReceived,
      pcePcepSessionP2pPCReqMessagesSent,
      pcePcepSessionP2pPCRepMessagesSent,
      pcePcepSessionP2pPCReqMessagesReceived,
      pcePcepSessionP2pPCRepMessagesReceived
   }  
   STATUS current
   DESCRIPTION  
      "Objects that apply to all PCEP P2MP MIB implementations."
   ::= { pcePcepExtGroups 1 }
}

END

6.2. Objects for inclusion in module PCE-PCEP-DRAFT-MIB

Following are the objects maybe moved to [PCE-PCEP-DRAFT-MIB] after consensus with the authors and working group.
pcpPcepClientVersionnumber,
pcpPcepClientP2mpCapabilityStatus,
pcpPcepClientOverloadStatus,
pcpPcepClientOverloadDuration,
pcpPcepSessionTotalMessagesSent,
pcepPcepSessionOpenMessagesSent,
pcepPcepSessionKeepaliveMessagesSent,
pcepPcepSessionPCNtfMessagesSent,
pcepPcepSessionPCErrMessagesSent,
pcepPcepSessionTotalMessagesReceived,
pcepPcepSessionOpenMessagesReceived,
pcepPcepSessionKeepaliveMessagesReceived,
pcepPcepSessionPCNtfMessagesReceived,
pcepPcepSessionPCErrMessagesReceived,
pcepPcepSessionIntraDomainRequest,
pcepPcepSessionInterDomainRequest,
pcepPcepSessionSuccessComps,
pcepPcepSessionNoReply,
pcepPcepSessionSynchronization,
pcepPcepSessionReoptimization,
pcepPcepSessionFragmentation,
pcepPcepSessionP2pPCReqMessagesSent,
pcepPcepSessionP2pPCRepMessagesSent,
pcepPcepSessionP2pPCReqMessagesReceived,
pcepPcepSessionP2pPCRepMessagesReceived

7. IANA Considerations

TBD

8. Security Considerations

The readable objects in the PCE-PCEP-P2MP-DRAFT-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.

9. References

9.1. Normative References


9.2. Informative References


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