

Network Working Group  
Internet Draft  
Expires: Nov 2002

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May 2002

**SONET/SDH Circuit Emulation Service Over Packet (CEP) Management  
Information Base Using SMIV2**

[draft-danenberg-pw-cem-mib-02.txt](#)

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## **1 Abstract**

This memo defines an experimental portion of the Management Information Base (MIB) for use with network management protocols in the Internet community. In particular, it describes managed objects for modeling Native Service Processing of SONET/SDH circuits over a Packet Switch Network (PSN).

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## [2](#) Introduction

This document describes a model for managing encapsulated SONET Time Division Multiplexed (TDM) digital signals for transmission over a Packet Switched Network (PSN).

This document is closely related to [\[CEP\]](#), which describes the technology to encapsulate TDM signals and provide the Circuit Emulation Service over a Packet Switched Network (PSN). This document is also related to [\[TRANS and ENCAP\]](#), describing the transport and encapsulation of Layer 2 circuits over MPLS, respectively. NOTE: the CEP encapsulation can be used over non-MPLS PSNs as well as MPLS PSNs.

The model for CEP management is a MIB. The CEP MIB described in this document works closely with the MIBs described in [\[PWMIB\]](#) and the textual conventions defined in [\[PWTC\]](#). In the spirit of the [\[IFMIB\]](#), a CEP connection will be a virtual connection (VC), and will therefore not be represented in the ifTable.

CEP is currently specified to carry "structured" SONET paths. Meaning that each SONET path within the section/line can be processed separately. The SONET section/line interface stack is modeled within [\[SONETMIB\]](#). The CEP MIB will reference SONET paths as modeled within [\[SONETMIB\]](#).

Comments should be made directly to PWE3 at [pwe3@ietf.org](mailto:pwe3@ietf.org).

This memo does not, in its draft form, specify a standard for the Internet community.

Conventions used in this document

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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 [RFC-2119](#) [[BCP14](#)].

### **3 Terminology**

CEP terminology comes from the CEP draft that describes a mechanism for transporting SONET Time Division Multiplexed (TDM) digital signals over a packet-oriented network. The mechanism for structured (as outlined in the CEP draft) terminates the SONET section and line overhead and then breaks the SONET path's Synchronous Payload Envelope (SPE) into fragments for transmission over a PSN. A CEP header is appended at the beginning of each fragment to provide information regarding where the SPE begins within the packet stream, a sequence number, and pointer adjustment information (see [[CEP](#)]).

"NSP" (Native Service Processing) refers to the method of adapting a "native" service such that it can be presented to the PW (Pseudo-Wire) for transmission across the packet core. In this case, the native protocol is SONET/SDH. See [[LAYER](#)].

"Outbound" references the traffic direction where a SONET path's payload (SPE) is received, adapted to packet, assigned a VC label, and sent into the PSN.

Conversely, "inbound" is the direction where packets are received from the PSN, packet payloads are reassembled back into an SPE, and inserted as a SONET path into the SONET section and line.

Since A SONET path is bi-directional and symmetrical, it uses the same SONET time-slot, SONET width, packet size. Inbound and outbound VC labels may differ.

CEP will normally transmit into an originating "head" end of a PSN's tunnel, and receive from a terminating "tail" end a PSN's tunnel. In the case of an MPLS PSN, a CEP connection typically uses a VC (virtual connection) Label within a Tunnel Label [[TRANS](#)]. Multiple CEP VCs each with a unique VC Label and similar traffic engineering requirements can share the same PSN tunnel. For MPLS PSNs, the Tunnel

Label is known as the "outer" Label, while the VC Label is known as the "inner" Label. An exception to this is with adjacent MPLS LSRs. In this case, there is an option for CEP VCs to connect directly without an outer Label.

#### 4 The SNMP Management Framework

The SNMP Management Framework presently consists of five major components:

- o An overall architecture, described in [RFC 2571](#) [[RFC2571](#)].

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- o Mechanisms for describing and naming objects and events for the purpose of management. The first version of this Structure of Management Information (SMI) is called SMIV1 and described in STD 16, [RFC 1155](#) [[RFC1155](#)], STD 16, [RFC 1212](#) [[RFC1212](#)] and [RFC 1215](#) [[RFC1215](#)]. The second version, called SMIV2, is described in STD 58, [RFC 2578](#) [[RFC2578](#)], STD 58, [RFC 2579](#) [[RFC2579](#)] and STD 58, [RFC 2580](#) [[RFC2580](#)].

- o Message protocols for transferring management information. The first version of the SNMP message protocol is called SNMPv1 and described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second version of the SNMP message protocol, which is not an Internet standards track protocol, is called SNMPv2c and described in [RFC 1901](#) [[RFC1901](#)] and [RFC 1906](#) [[RFC1906](#)]. The third version of the message protocol is called SNMPv3 and described in [RFC 1906](#) [[RFC1906](#)], [RFC 2572](#) [[RFC2572](#)] and [RFC 2574](#) [[RFC2574](#)].

- o Protocol operations for accessing management information. The first set of protocol operations and associated PDU formats is described in STD 15, [RFC 1157](#) [[RFC1157](#)]. A second set of protocol operations and associated PDU formats is described in [RFC 1905](#) [[RFC1905](#)].

- o A set of fundamental applications described in [RFC 2573](#) [[RFC2573](#)] and the view-based access control mechanism described in [RFC 2575](#) [[RFC2575](#)].

A more detailed introduction to the current SNMP Management Framework can be found in [RFC 2570](#) [[RFC2570](#)]. Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the mechanisms defined in the SMI. This memo specifies a MIB module that is compliant to the SMIV2. A MIB conforming to the SMIV1 can be produced through the appropriate translations. The resulting translated MIB must be

semantically equivalent, except where objects or events are omitted because no translation is possible (use of Counter64). Some machine readable information in SMIV2 will be converted into textual descriptions in SMIV1 during the translation process. However, this loss of machine readable information is not considered to change the semantics of the MIB.

#### **4.1 Object Definitions**

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. Objects in the MIB are defined using the subset of Abstract Syntax Notation One (ASN.1) defined in the SMI. In particular, each object type is named by an OBJECT IDENTIFIER, an administratively assigned name. The object type together with an object instance serves to uniquely identify a specific instantiation of the object. For human convenience, we often use a textual string, termed the descriptor, to also refer to the object type.

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#### **5 Feature Checklist**

This MIB is designed to satisfy the following requirements and constraints:

- Fits within the architecture defined [[PWMIB](#)].
- The MIB supports point-to-point CEP connections. Point-to-multipoint connections are for future study.
- The MIB configures the connection: timeslots, packet length, error actions, and many other CEP objects.
- The MIB reports: packet counts, error counts, and many other status objects.

#### **6 CEP MIB usage**

##### **6.1 Summary of CEP MIB**

- The CEP VC Table (pwVcCepTable) contains the SONET Path ifIndex, SONET Path Time slot, the pwVcCepCfgTable index, config error indications, and various status indications.
- The CEP VC Configuration Parameter Table (pwVcCepCfgTable) has

objects for CEP VC configuration. In situations where sets of config objects are common amongst more than 1 CEP VC, 1 entry here may be referenced by many pwVcCepTable entries.

- The CEP Performance Current Table (pwVcCemPerfCurrentTable) contains CEP stats for the current 15-minute period.

- The CEP Performance Interval Table (pwVcCemPerfIntervalTable) is similar to the pwVcCemPerfCurrentTable. It contains historical intervals (usually 96 15-minute entries to cover a 24 hour period).

Note: the performance interval statistics are supported by CEP due to the very function of CEP - that is, processing SONET. See [[SONETMIB](#)].

- The CEP Performance Total Table (pwVcCepPerfTotalTable) is similar to the pwVcCemPerfCurrentTable. It contains statistics accumulated since the CEP VC was first established.

- The Conformance Config Table (pwVcCepConformanceCfgTable) allows the vendor to specify the extent to which certain objects are supported (or not).

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## **[6.2](#) CEP configuration Step by Step**

Configuring a CEP VC involves the following steps.

First create an entry in the pwVcTable and configure the PSN tunnels:

- Follow steps as defined in [[PWMIB](#)].

Configure the SONET Path parameters :

- Set the SONET path width in the sonetPathCurrentTable [[SONETMIB](#)].

- Set the SONET path index and the SONET path starting time slot in the pwVcCepTable.

NOTE: The agent will have created an entry in the pwVcCepTable based on the entry created in the pwVcTable.

Configure the CEP VC:

- If necessary, create an entry in the pwVcCepCfgTable (a suitable entry may already exist). Set packet length, etc.
- Set the index of this pwVcCepCfgTable entry in the pwVcCepTable.

Observe the CEP VC:

- Once a CEP VC is operational, the pwVcCepPerfCurrentTable, pwVcCepPerfIntervalTable, and pwVcCepPerfTotalTable are used to monitor the various counts, indicators, and conditions of the VC.

Conforming to the CEP MIB objects:

- The pwVcCepConformanceCfgTable is used to state True/False whether certain objects are supported. An ASCII string object is available with every True/False object as a means to explain the extent of 'true' support, or perhaps explain why the 'false' was set.

## **7 Example of CEP Setup**

In this section we provide an example of using the MIB objects described in [section 8](#) to set up a CEP VC (width of 3 STSs, starting at time slot 1). 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. See [[PWMIB](#)] for an example of setting up PSN Tunnels.

First configure the SONET path width, starting time-slot, and associated CEP VC. In this case, an STS-3c starts at SONET time slot 1 (and is distributed normally within the SONET frame). In the following example, the ifIndex for the sonetPathCurrentEntry is 23, while the pwVcCepCfgTable index is 9.

```
In [SONETMIB] sonetPathCurrentEntry (ifIndex = 23) :
{
    sonetPathCurrentWidth          = 3,
    sonetPathCurrentStatus
    ...
    ...
}
```

Create an entry in the pwVcCepCfgTable (index = 9) :

```
{
    pwVcCepCfgNormalPktLength      = 500 -- payload bytes
    pwVcCepCfgMinPktLength         = 0   -- no minimum
    pwVcCepCfgPktReorder           = FALSE
    pwVcCepCfgEnableDBA            = ais
    pwVcCepCfgJtrBfrDepth          = 500 -- micro-seconds

    pwVcCepCfgConsecPktsInsync     = 2   -- Exit LOPS state
    pwVcCepCfgConsecMissingOutSync = 10  -- Enter LOPS state

    pwVcCepCfgPktErrorPlayOutValue = playAllOnes

    pwVcCepCfgMissingPktsToSes     = 3   -- packets,
    pwVcCepCfgSesToUas              = 2   -- seconds,
    pwVcCepCfgSecsToExitUas         = 10  -- seconds,

    pwVcCepCfgRowStatus             = createAndGo
}
```

Check that there are no error bits set in pwVcCepConfigError.

In PW-MIB: Get a new index and create a new pwVcTable entry using pwVcIndexNext (here, the VC index = 83) and pwVcRowStatus. In this new entry, set pwVcType to 'cep'. This should create a new entry in the pwVcCepTable. Set up and the SONET path ifIndex, SONET path time slot, and Cfg Table indexes within this new pwVcCep table entry:

```
{
    pwVcCepSonetIfIndex            = 23 -- Index of associated entry
```



```

-- in sonetPathCurrent table.

pwVcCepSonetTimeSlot    = 1 -- Starting time slot.

pwVcCepCfgIndex         = 9 -- Index of associated entry
                        -- in pwVcCepCfg table (above).
}

```

Check that there are no error bits set in pwVcCepSonetConfigError.

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## [8](#) CEP MIB definitions

```
PW-CEP-MIB DEFINITIONS ::= BEGIN
```

IMPORTS

MODULE-IDENTITY, OBJECT-TYPE, NOTIFICATION-TYPE,  
experimental, Integer32, Counter32, Unsigned32,  
Counter64  
FROM SNMPv2-SMI

MODULE-COMPLIANCE, OBJECT-GROUP, NOTIFICATION-GROUP  
FROM SNMPv2-CONF

TEXTUAL-CONVENTION, TruthValue, RowStatus, StorageType,  
TimeStamp  
FROM SNMPv2-TC

InterfaceIndexOrZero  
FROM IF-MIB

PerfCurrentCount, PerfIntervalCount  
FROM PerfHist-TC-MIB

pwVcIndex, pwVcOperStatus  
FROM PW-MIB

SnmpAdminString  
FROM SNMP-FRAMEWORK-MIB;

-- The CEP MIB

pwVcCepMIB MODULE-IDENTITY

LAST-UPDATED "0205291200Z" -- May 29 2002 12:00:00 EST  
ORGANIZATION "Pseudo-Wire Emulation Edge-to-Edge (PWE3)  
Working Group"

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#### DESCRIPTION

"This MIB contains managed object definitions for Circuit Emulation over Packet (CEP) as in: Malis, A., Vogelsang, S., Johnson, T., and Martini, L. 'SONET/SDH Circuit Emulation Over Packet (CEP) encapsulation', Internet Draft <[draft-malis-pwe3-sonet-02.txt](#)>, expires September 2002.

This MIB reports to the PW-MIB. The PW-MIB contains structures and MIB associations generic to Pseudo-Wire Virtual Circuit (VC) emulation. VC-specific MIBs (such as this) contain config and stats for specific VC types."

-- Revision history.

#### REVISION

"0205291200Z" -- 29 May 2002 12:00:00 EST

#### DESCRIPTION

- "- Renamed EsTimeStamp to LastErrorTimeStamp.
- Renamed LastDefectsAtEs to LatchedIndications.
- Renamed CurrentDefects to CurrentIndications.
- Renamed defect indications (cepAis, cepRdi).
- Renamed DBA bit settings (ais and unequipped).
- Added objects: CfgJtrBfrResetOorange and CfgJtrBfrResetOorangeCnt.
- Moved SONET Time Slot and Time Slot cfg error to CEP table from SONET extension table. Deleted SONET extension table.

- Added Failure Counts (FCs) to stats tables.
- Removed pwVcCepPerfCurrentTimeElapsed (it is a duplicate of pwVcCepTimeElapsed).
- Removed 32-bit counters that were duplicates of 64-bit (HC) counters.
- Other minor changes."

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#### REVISION

"0202271200Z" -- 27 February 2002 12:00:00 EST

#### DESCRIPTION

- "- Added objects pwVcCepTimeElapsed and pwVcCepValidIntervals for more accurate knowledge of interval data.
- Changed pwVcCepCfgJtrBfrDepth units from packets to microseconds, and updated description.
- Changed JtrBfrOoseqDropped to JtrBfrOoRngDropped (i.e, 'out of sequence' to 'out of range').
- Removed JtrBfrOverruns counter objects. This info is now contained within the JtrBfrOoRngDropped object.
- Changed description of JtrBfrUnderrun.
- Moved LastDefectsAtEs, LastEsTimeStamp, and DiscontinuityTime to the pwVcCepTable table. Removed them as conformance config objects.
- Created new CurrentDefects in CepTable.
- Added cepAis to and changed rdi to cepRdi (both are now in LastDefectsAtEs). Added note to cepAis - it must not (in itself) cause a cep down notification.
- Changed the pwVcCepSonetExtTable to augment the sonetPathCurrentTable in [RFC 2558](#). Imported sonetPathCurrentTable from the SONET-MIB.
- Renamed PktResequenece to PktReorder."

#### REVISION

"0111161200Z" -- 16 November 2001 12:00:00 EST

#### DESCRIPTION

- "- Changed CEM to CEP.
- Removed: 'unstructured' CEP type, ECC references, and signaling (CEP options) references, multiple VC instances references, and APS references.
- Improved descriptions and some improved object names.
- New conformance section. New ConformanceCfg table.
- PktResequenece is now read-only.
- ConfMaxPktLength is now ConfNormalPktLength.
- Replaced User Error Action with PlayOutValue.

- New cfg object : consecutive non-SESSs to exit UAS.
  - New cfg objects : elapsed time for stats intervals.
  - New stats object: summary packet error.
  - New object : added ConfigError to SonetExt table.
- NOTE: Many objects added, deleted, or moved - so many OIDs have been re-ordered."

REVISION

"0109071200Z" -- 07 September 2001 12:00:00 EST

DESCRIPTION

- "- Separated Top level Cfg objects from Total CEM stats.
- Removed references to VC instances."

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REVISION

"0107191200Z" -- 19 July 2001 12:00:00 EST

DESCRIPTION

"Based on the PWE3 Requirements/Framework, the original CEM MIB ([draft-danenberg-sonet-ces-mpls-mib-00.txt](#)) has Been split into 3 drafts:

- PW-MIB (Zelig, et al). Service-independent MIB.
- PW-TC-MIB (Nadeau, et al). Textual Conventions.
- PW-CEM-MIB (Danenberg, et al). Service-specific MIB.

Aside from the split, then PW-CEM-MIB has undergone other changes:

- Ability to define LOPS (loss of packet sync), SES and UAS.
- Support for 'unstructured' operation.
- Support for CEM-RDI.
- Many more minor changes and clarifications."

::= { experimental xxxx } -- To be assigned by IANA

-- Local Textual conventions

PwVcCepCfgIndex ::= TEXTUAL-CONVENTION

STATUS current

DESCRIPTION

"Index into the pwVcCepCfgTable."

SYNTAX Unsigned32

-- Top level components of this MIB.

-- Traps

```

pwVcCepNotifications OBJECT IDENTIFIER
                        ::= { pwVcCepMIB 0 }
pwVcCepNotifyPrefix OBJECT IDENTIFIER
                        ::= { pwVcCepNotifications 0 }
-- Tables, Scalars
pwVcCepObjects OBJECT IDENTIFIER
                ::= { pwVcCepMIB 1 }
-- Conformance
pwVcCepConformance OBJECT IDENTIFIER
                    ::= { pwVcCepMIB 2 }

```

-- CEP VC table

```

pwVcCepTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF PwVcCepEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This table contains the index to the entry SONET path
        table for this CEP VC, and the index to the CEP config
        table."

```

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```
 ::= { pwVcCepObjects 1 }
```

```

pwVcCepEntry OBJECT-TYPE
    SYNTAX          PwVcCepEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This MIB reports to the PW-MIB. This table is indexed by
        the same index that was created for the associated entry
        in the PW VC Table (in the PW-MIB).

```

- The PwVcIndex.

An entry is created in this table by the agent for every entry in the pwVc table with a VcType of 'cep'."

```
INDEX { pwVcIndex }
```

```
 ::= { pwVcCepTable 1 }
```

```
PwVcCepEntry ::= SEQUENCE {
```

```

    pwVcCepType          INTEGER,
    pwVcCepSonetIfIndex  InterfaceIndexOrZero,
    pwVcCepSonetTimeSlot Unsigned32,
    pwVcCepSonetConfigError BITS,

```

```

pwVcCepCfgIndex          PwVcCepCfgIndex,
pwVcCepTimeElapsed      Integer32,
pwVcCepValidIntervals   Integer32,
pwVcCepCurrentIndications  BITS,
pwVcCepLatchedIndications  BITS,
pwVcCepLastEsTimeStamp   TimeStamp
}

```

pwVcCepType OBJECT-TYPE

```

SYNTAX INTEGER {
    structured (1)
}

```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Specifies the type of CEP VC. Currently only structured types are supported. Other CEP Types may be defined in the future.

Note: This object MUST be changed to 'read-write' if other CEP types are added."

DEFVAL { structured }

::= { pwVcCepEntry 1 }

pwVcCepSonetIfIndex OBJECT-TYPE

SYNTAX InterfaceIndexOrZero

MAX-ACCESS read-write

STATUS current

DESCRIPTION

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"This is a unique index within the ifTable. It represents the interface index for the SONET path. A value of zero indicates an interface index that has yet to be determined. Once set, if the SONET ifIndex is (for some reason) later removed, the agent MAY delete the associated PW VC rows (e.g., this pwVcCep table entry). If the agent does not delete the rows, it is recommended that the agent set this object to zero."

::= { pwVcCepEntry 2 }

pwVcCepSonetTimeSlot OBJECT-TYPE

SYNTAX Unsigned32 (1..192)

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"In structured CEP, this object indicates the starting time-slot for this SONET path within the SONET line and section. For OC-48, this value could range from 1

to 48. The SONET path width must be taken into consideration here. For example, in an OC-48, an STS-3c could not start at time-slot 47."

REFERENCE "[RFC 2558](#), sonetPathCurrentWidth."

::= { pwVcCepEntry 3 }

pwVcCepSonetConfigError OBJECT-TYPE

SYNTAX BITS {

other ( 0),  
timeslotInUse ( 1),  
timeslotMisuse( 2)

}

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"timeslotInUse is when another CEP VC (via SONET ifIndex) has already reserved a timeslot(s) that this CEP VC is attempting to reserved.  
timeslotMisuse is set, for example, if specifying a starting timeslot of 45 for a SONET path of an STS-12c width."

::= { pwVcCepEntry 4 }

pwVcCepCfgIndex OBJECT-TYPE

SYNTAX PwVcCepCfgIndex

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Index to CEP configuration table below. It is likely that multiple CEP VCs will share 1 CEP Cfg table entry."

::= { pwVcCepEntry 5 }

pwVcCepTimeElapsed OBJECT-TYPE

SYNTAX Integer32 (1..900)

MAX-ACCESS read-only

STATUS current

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DESCRIPTION

"The number of seconds, including partial seconds, that have elapsed since the beginning of the current measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock, the current interval exceeds the maximum value, the agent will return the maximum value."

::= { pwVcCepEntry 6 }

pwVcCepValidIntervals OBJECT-TYPE



```

SYNTAX Integer32 (0..96)
MAX-ACCESS read-only
STATUS current
DESCRIPTION
    "The number of previous 15-minute intervals
    for which data was collected.
    An agent with CEP capability must be capable
    of supporting at least n intervals. The minimum value
    of n is 4, The default of n is 32 and the maximum value
    of n is 96.
    The value will be <n> unless the measurement was
    (re-)started within the last (<n>*15) minutes, in which
    case the value will be the number of complete 15
    minute intervals for which the agent has at least
    some data. In certain cases (e.g., in the case
    where the agent is a proxy) it is possible that some
    intervals are unavailable. In this case, this
    interval is the maximum interval number for
    which data is available. "
 ::= { pwVcCepEntry 7 }

```

pwVcCepCurrentIndications OBJECT-TYPE

```

SYNTAX BITS {
    missingPkt ( 0),
    ooRngDropped( 1),
    jtrBfrUnder ( 2),
    pktBadLength( 3),
    lops ( 4),
    cepRdi ( 5),
    cepAis ( 6)
}

```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Definitions:

missingPkt - While playing out a sequence of packets, a packet(s) was determined to be missing based on a gap in the CEP sequence number. Note: If the implementation supports packet re-ordering, detecting gaps should not take place as packets arrive, only as they are played out - this gives time for mis-ordered packets to arrive late.

ooRngDropped - Packet(s) arrives that is outside the range of the jitter buffer. This may be because the

jitter buffer is full, or the sequence number addresses a buffer outside the current jitter buffer range, or addresses an already occupied buffer within range. Whether or not packet re-ordering is supported by the implementation, this indication MUST be supported.

jtrBfrUnder - The jitter buffer underflowed due to not enough packets arriving as packets were being played out.

pktBadLength - Non-bandwidth-saving packet arrives larger or smaller than pwVcCepCfgNormalPktLength.

lops - Loss Of Packet Sync. See malis-pwe3-sonet.

cepRdi - Circuit Emulation over Packet Remote Defect Indication. Generated by the remote CEP de-packetizer when detecting LOPS. Note: not generated by the remote SONET function. See malis-pwe3-sonet.

cepAis - Remote CEP packetizer has detected AIS on its incoming SONET stream. See malis-pwe3-sonet. Note: cepAis MUST NOT (in itself) cause a CEP down notification. This would be a layer violation.

Note: currently there is no hierarchy of CEP defects.

Note: the algorithm used to capture these indications is implementation specific."

```
::= { pwVcCepEntry 8 }
```

pwVcCepLatchedIndications OBJECT-TYPE

```
SYNTAX BITS {  
    missingPkt ( 0),  
    ooRngDropped( 1),  
    jtrBfrUnder ( 2),  
    pktBadLength( 3),  
    lops ( 4),  
    cepRdi ( 5),  
    cepAis ( 6)  
}
```

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The state of CEP indicators when the CEP VC last declared an errored second (either as ES, SES or a second with errors inside a UAS) condition. At this time, only LOPS can create a failure. Since indicators other than LOPS are useful, all are latched here. For bit definitions, see pwVcCepCurrentIndications above.

Note: the algorithm used to latch these indications when entering an defect state is implementation specific."  
 ::= { pwVcCepEntry 9 }

pwVcCepLastEsTimeStamp OBJECT-TYPE

SYNTAX TimeStamp

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"The value of sysUpTime on the most recent occasion at which the CEP VC entered the ES or SES state."

::= { pwVcCepEntry 10 }

-- End of PW CEP VC table

-- Obtain index for PW CEP Configuration table entries

pwVcCepCfgIndexNext OBJECT-TYPE

SYNTAX PwVcCepCfgIndex

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"This object contains an appropriate value to be used for pwVcCepCfgIndex when creating entries in the pwVcCepCfgTable. The value 0 indicates that no unassigned entries are available. To obtain the value of pwVcCepCfgIndex for a new entry in the pwVcCepCfgTable, the manager issues a management protocol retrieval operation to obtain the current value of pwVcCepCfgIndex. After each retrieval operation, the agent should modify the value to reflect the next unassigned index. After a manager retrieves a value the agent will determine through its local policy when this index value will be made available for reuse."

::= { pwVcCepObjects 2 }

-- PW CEP VC Configuration Table

pwVcCepCfgTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwVcCepCfgEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table contains a set of parameters that may be referenced by 1 or more CEP VCs by pwVcCepTable."

```
::= { pwVcCepObjects 3 }
```

```
pwVcCepCfgEntry    OBJECT-TYPE  
SYNTAX             PwVcCepCfgEntry  
MAX-ACCESS         not-accessible  
STATUS             current  
DESCRIPTION
```

"These parameters define the characteristics of a

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CEP VC. They are grouped here to ease NMS burden.  
Once an entry is created here it may be re-used  
by many VCs."

```
INDEX { pwVcCepCfgTableIndex }
```

```
::= { pwVcCepCfgTable 1 }
```

```
PwVcCepCfgEntry ::= SEQUENCE {  
    pwVcCepCfgTableIndex          PwVcCepCfgIndex,  
    pwVcCepCfgConfigError        BITS,  
  
    pwVcCepCfgNormalPktLength    Unsigned32,  
    pwVcCepCfgMinPktLength      Unsigned32,  
    pwVcCepCfgPktReorder        TruthValue,  
    pwVcCepCfgEnableDBA         BITS,  
  
    pwVcCepCfgJtrBfrDepth       Unsigned32,  
    pwVcCepCfgJtrBfrRebuild0or  TruthValue,  
    pwVcCepCfgJtrBfrRebuild0orCount Unsigned32,  
  
    pwVcCepCfgConsecPktsInsync  Unsigned32,  
    pwVcCepCfgConsecMissingOutSync Unsigned32,  
  
    pwVcCepCfgPktErrorPlayOutValue Unsigned32,  
  
    pwVcCepCfgMissingPktsToSes  Unsigned32,  
    pwVcCepCfgSesToUas         Unsigned32,  
    pwVcCepCfgSecsToExitUas     Unsigned32,  
  
    pwVcCepCfgRowStatus         RowStatus,  
    pwVcCepCfgStorageType       StorageType  
}
```

```
pwVcCepCfgTableIndex OBJECT-TYPE  
SYNTAX             PwVcCepCfgIndex  
MAX-ACCESS         not-accessible  
STATUS             current  
DESCRIPTION
```

"Primary index to this table"  
 ::= { pwVcCepCfgEntry 1 }

pwVcCepConfigError OBJECT-TYPE

SYNTAX BITS {

    other          ( 0),  
    dba           ( 1),  
    lopsPktCount  ( 2),  
    pktLength     ( 3),  
    jtrBfrDepth   ( 4)

}

MAX-ACCESS      read-only

STATUS          current

DESCRIPTION

    "Various configurations errors. Illegal settings within

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    the pwVcCepCfg or pwVcCepSonetExt tables."  
 ::= { pwVcCepCfgEntry 2 }

pwVcCepCfgNormalPktLength OBJECT-TYPE

SYNTAX          Unsigned32

MAX-ACCESS      read-create

STATUS          current

DESCRIPTION

    "This is the CEP packet length in number of bytes  
    (including CEP header and payload) used when the  
    packet is NOT a DBA packet. This length applies to  
    inbound and outbound packets carrying user payload.  
    Although there is no control over inbound packets,  
    those of illegal length are discarded and accounted  
    for (see pwVcCepPerf...PktsBadLength.)

    Note: DBA packets have their own (shorter) length  
    and are not effected by this setting. If CEP payload  
    compression were supported (future), compressed packets  
    would have their own (shorter) length and also not  
    effected by this setting. "

REFERENCE

    "See FEC element format and Interfaces Parameters format  
    in Martini. L, et al, <[draft-martini-l2circuit-trans-  
mpls-06](#)>. For use of payload bytes see Malis, A., et al,  
    <[draft-malis-pwe3-sonet-02.txt](#)>."

::= { pwVcCepCfgEntry 3 }

pwVcCepCfgMinPktLength OBJECT-TYPE

SYNTAX          Unsigned32

MAX-ACCESS      read-create

STATUS current

DESCRIPTION

"This is the minimum CEP packet length in number of bytes (including CEP header and payload). It applies to CEP's bandwidth-savings packets. Currently DBA is the only bandwidth-savings packet type (in the future, CEP may support compression). Minimum packet length is necessary in some systems or networks.

Setting Zero here indicates that there is no minimum packet restriction."

REFERENCE

"See FEC element format and Interfaces Parameters format in Martini. L, et al, <[draft-martini-l2circuit-trans-mpls-06](#)>. For use of payload bytes see Malis, A., et al, <[draft-malis-pwe3-sonet-02.txt](#)>."

DEFVAL { 0 }

::= { pwVcCepCfgEntry 4 }

pwVcCepCfgPktReorder OBJECT-TYPE

SYNTAX TruthValue

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MAX-ACCESS read-only

STATUS current

DESCRIPTION

"If set True: as inbound packets are queued in the jitter buffer, out of order packets are re-ordered. The maximum sequence number differential (i.e., the range in which resequencing can occur) is dependant on the depth of the jitter buffer. See pwVcCepCfgJtrBfrDepth.

NOTE: Some implementations may not support this feature. The agent is then required to set this False."

::= { pwVcCepCfgEntry 5 }

pwVcCepCfgEnableDBA OBJECT-TYPE

SYNTAX BITS {

ais (0),

unequipped (1)

}

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Bits set here MUST enable the DBA (dynamic bandwidth allocation) feature for the specified condition. Setting

'ais' MUST cause CEP packet payload suppression when AIS is detected on the associated SONET path. Similarly, 'unequipped' MUST cause payload suppression when an un-equipped condition is detected on the SONET path. During these conditions, CEP packets will continue to be sent, but with indicators set in the CEP header instructing the remote to play all ones (for AIS) or all zeros (for un-equipped) onto its SONET path.

NOTE: Some implementations may not support this feature. In these cases, if the 'ais' or 'unequipped' bits are set, then 'dba' error code MUST be set in pwVcCepConfigError."

#### REFERENCE

"See Malis, A., et al, <[draft-malis-pwe3-sonet-02.txt](#)>."

```
DEFVAL { { unequipped } }  
::= { pwVcCepCfgEntry 6 }
```

#### pwVcCepCfgJtrBfrDepth OBJECT-TYPE

```
SYNTAX      Unsigned32  
UNITS       "micro-seconds"  
MAX-ACCESS  read-create  
STATUS      current
```

#### DESCRIPTION

"This setting configures the number of microseconds of expected packet delay variation for this CEP VC over the PSN.

The actual jitter buffer MUST be at least twice this value for proper operation, and is implementation specific.

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If configured to a value not supported by the implementation, the agent MUST return an error code 'jtrBfrDepth' in 'pwVcCepConfigError '

NOTE: Like bandwidth and time-slots, jitter buffers are a limited resource to be managed."

```
::= { pwVcCepCfgEntry 7 }
```

#### pwVcCepCfgJtrBfrRebuildOor OBJECT-TYPE

```
SYNTAX      TruthValue  
MAX-ACCESS  read-create  
STATUS      current
```

#### DESCRIPTION

"When set TRUE, the jitter buffer will rebuild when the RebuildOorCount (consecutive out-of-range

packet counter) has reached it's config'ed setting.  
If set FALSE, then the jitter buffer will continue  
to function regardless of out-of-range packets."  
DEFVAL { true }  
::= { pwVcCepCfgEntry 8 }

pwVcCepCfgJtrBfrRebuild0orCount OBJECT-TYPE

SYNTAX Unsigned32 (0..255)

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"Used by Rebuild0or above. For every consecutive  
out-of-range packet received, a count is incremented.  
If it matches this value, the jitter bfr resets and  
rebuilds."

DEFVAL { 3 }

::= { pwVcCepCfgEntry 9 }

--

-- The following counters work together to integrate (filter)  
-- errors and the lack of errors on the CEP VC. An error is  
-- caused by a missing packet. Missing packet can be a result  
-- of: packet loss in the network, (uncorrectable) packet out  
-- of sequence, packet length error, jitter buffer overflow,  
-- and jitter buffer underflow. The result is declaring whether  
-- or not the CEP VC is in Loss of Packet Sync (LOPS) state.

--

pwVcCepCfgConsecPktsInsync OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-create

STATUS current

DESCRIPTION "Consecutive pkts with sequential sequence  
numbers required to exit the LOPS state."

REFERENCE

"See Malis, A., et al, <[draft-malis-pwe3-sonet-02.txt](#)>."

DEFVAL { 2 }

::= { pwVcCepCfgEntry 10 }

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pwVcCepCfgConsecMissingOutSync OBJECT-TYPE

SYNTAX Unsigned32

MAX-ACCESS read-create

STATUS current

DESCRIPTION "Consecutive missing pkts required to enter  
the LOPS state."

REFERENCE



```
"See Malis, A., et al, <draft-malis-pwe3-sonet-02.txt>."
DEFVAL { 10 }
::= { pwVcCepCfgEntry 11 }
```

pwVcCepCfgPktErrorPlayOutValue OBJECT-TYPE

```
SYNTAX      Unsigned32 (0..255)
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "This is the value played when inbound packets have
    over/underflowed the jitter buffer, or are missing
    for any reason. This byte pattern is sent (played) on
    the SONET path."
DEFVAL { 255 } -- Play all ones
::= { pwVcCepCfgEntry 12 }
```

pwVcCepCfgMissingPktsToSes OBJECT-TYPE

```
SYNTAX      Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "Number of missing packets detected (consecutive or not)
    within a 1 second window to cause a Severely Errored
    Second (SES) to be counted."
DEFVAL { 3 }
::= { pwVcCepCfgEntry 13 }
```

pwVcCepCfgSesToUas OBJECT-TYPE

```
SYNTAX      Unsigned32
UNITS       "seconds"
MAX-ACCESS  read-create
STATUS      current
DESCRIPTION
    "Number of consecutive SESSs before declaring VC in UAS
    state (and at which point pwVcCepPerfUASs starts counting).
    The SesToUas default value is 10 seconds.
```

NOTE: Similar to [RFC 2558](#), If the agent chooses to update the various performance statistics in real time then it must be prepared to retroactively reduce the ES, SES, counts by this value and increase the UAS count by this value when it determines that UAS state has been entered.

NOTE: See pwVcCepPerfSESSs and pwVcCepPerfUASs."

```
DEFVAL { 10 }
```

```
::= { pwVcCepCfgEntry 14 }
```

```
pwVcCepCfgSecsToExitUas OBJECT-TYPE
```

```
SYNTAX      Unsigned32
```

```
UNITS       "seconds"
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "Number of consecutive nonSESS before declaring VC is NOT  
    in UAS state (and at which point pwVcCepPerfUASs stops  
    counting)."
```

```
DEFVAL { 10 }
```

```
::= { pwVcCepCfgEntry 15 }
```

```
pwVcCepCfgRowStatus      OBJECT-TYPE
```

```
SYNTAX      RowStatus
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "For creating, modifying, and deleting this row."
```

```
::= { pwVcCepCfgEntry 16 }
```

```
pwVcCepCfgStorageType   OBJECT-TYPE
```

```
SYNTAX      StorageType
```

```
MAX-ACCESS  read-create
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "This variable indicates the storage type for this  
    object."
```

```
::= { pwVcCepCfgEntry 17 }
```

```
-- End of PW CEP VC Configuration Parameter Table
```

```
-- CEP VC Performance Current Interval Table.
```

```
pwVcCepPerfCurrentTable OBJECT-TYPE
```

```
SYNTAX      SEQUENCE OF PwVcCepPerfCurrentEntry
```

```
MAX-ACCESS  not-accessible
```

```
STATUS      current
```

```
DESCRIPTION
```

```
    "CEP bridges the SONET and packet worlds. In the packet  
    world, counts typically start from the time of service  
    creation - and don't stop. In the SONET world, counts are  
    kept in 15 minute intervals. The CEP-MIB supports both  
    methods. The current 15 minute interval counts are in  
    this table. The interval and total stats are in tables  
    following this.
```

```
    This table provides per CEP VC performance information.  
    HC (high capacity) counters are required for some counts
```

due to the high speeds expected with CEP services. A SONET path of width 48 (STS-48c) can rollover non-HC counters in a few minutes."

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::= { pwVcCepObjects 4 }

pwVcCepPerfCurrentEntry OBJECT-TYPE

SYNTAX PwVcCepPerfCurrentEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry in this table is created by the agent for every pwVcCep entry. After 15 minutes, the contents of this table entry are copied to a new entry in the pwVcCepPerfInterval table and the counts in this entry are reset to zero."

INDEX { pwVcIndex }

::= { pwVcCepPerfCurrentTable 1 }

PwVcCepPerfCurrentEntry ::= SEQUENCE {

pwVcCepPerfCurrentDbainPacketsHC Counter64,  
pwVcCepPerfCurrentDbainOutPacketsHC Counter64,

pwVcCepPerfCurrentInNegPtrAdjust Counter32,  
pwVcCepPerfCurrentInPosPtrAdjust Counter32,  
pwVcCepPerfCurrentInPtrAdjustSecs Counter32,  
pwVcCepPerfCurrentOutNegPtrAdjust Counter32,  
pwVcCepPerfCurrentOutPosPtrAdjust Counter32,  
pwVcCepPerfCurrentOutPtrAdjustSecs Counter32,  
pwVcCepPerfCurrentAbsPtrAdjust Integer32,

pwVcCepPerfCurrentMissingPkts Counter32,  
pwVcCepPerfCurrentPktsOoseq Counter32,  
pwVcCepPerfCurrentPktsOorngDropped Counter32,  
pwVcCepPerfCurrentJtrBfrUnderruns Counter32,  
pwVcCepPerfCurrentPktsBadLength Counter32,  
pwVcCepPerfCurrentSummaryErrors Counter32,

pwVcCepPerfCurrentESs PerfCurrentCount,  
pwVcCepPerfCurrentSESSs PerfCurrentCount,  
pwVcCepPerfCurrentUASs PerfCurrentCount,  
pwVcCepPerfCurrentFC PerfCurrentCount

}

pwVcCepPerfCurrentDbainPacketsHC OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current  
DESCRIPTION  
"Number of DBA packets received."  
::= { pwVcCepPerfCurrentEntry 1 }

pwVcCepPerfCurrentDbaOutPacketsHC OBJECT-TYPE  
SYNTAX Counter64  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

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"Number of DBA packets sent."  
::= { pwVcCepPerfCurrentEntry 2 }

-- Pointer adjustment stats

pwVcCepPerfCurrentInNegPtrAdjust OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"Number of negative pointer adjustments sent on the  
SONET path based on CEP pointer adjustments received."  
::= { pwVcCepPerfCurrentEntry 3 }

pwVcCepPerfCurrentInPosPtrAdjust OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"Number of positive pointer adjustments sent on the  
SONET path based on CEP pointer adjustments received."  
::= { pwVcCepPerfCurrentEntry 4 }

pwVcCepPerfCurrentInPtrAdjustSecs OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION

"Number of seconds in which a pos or neg pointer  
adjustment was sent on the SONET path."  
::= { pwVcCepPerfCurrentEntry 5 }

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

DESCRIPTION

"Number of negative pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."  
 ::= { pwVcCepPerfCurrentEntry 6 }

pwVcCepPerfCurrentOutPosPtrAdjust OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"Number of positive pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."  
 ::= { pwVcCepPerfCurrentEntry 7 }

pwVcCepPerfCurrentOutPtrAdjustSecs OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

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DESCRIPTION

"Number of seconds in which a pos or neg pointer  
adjustment was seen on the SONET path."  
 ::= { pwVcCepPerfCurrentEntry 8 }

pwVcCepPerfCurrentAbsPtrAdjust OBJECT-TYPE

SYNTAX Integer32  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"Absolute Pointer adjustments is relative adjustment  
drifts between inbound and outbound streams. It is  
calculated as absolute value of :  
( InPosPtrAdjust - InNegPtrAdjust) -  
(OutPosPtrAdjust - OutNegPtrAdjust) "  
 ::= { pwVcCepPerfCurrentEntry 9 }

pwVcCepPerfCurrentMissingPkts OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"Number of missing packets (as detected via CEP header  
sequence number gaps)."  
 ::= { pwVcCepPerfCurrentEntry 10 }

pwVcCepPerfCurrentPktsOoseq OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of packets detected out of sequence (via CEP header sequence numbers), but successfully re-ordered.  
Note: some implementations may not support this feature (see pwVcCepCfgPktReorder)."  
::= { pwVcCepPerfCurrentEntry 11 }

pwVcCepPerfCurrentPktsOoRngDropped OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of packets detected out of range (via CEP header sequence numbers), and could not be re-ordered, or could not fit in the jitter buffer."  
::= { pwVcCepPerfCurrentEntry 12 }

pwVcCepPerfCurrentJtrBfrUnderruns OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of times a packet needed to be played out and the jitter buffer was empty."

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::= { pwVcCepPerfCurrentEntry 13 }

pwVcCepPerfCurrentPktsBadLength OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of normal (non-bandwidth-saving packets received) larger or smaller than pwVcCepCfgNormalPktLength."  
::= { pwVcCepPerfCurrentEntry 14 }

pwVcCepPerfCurrentSummaryErrors OBJECT-TYPE  
SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"A summary of all the packet error types above (from missing packets to bad length packets)."  
::= { pwVcCepPerfCurrentEntry 15 }

```
pwVcCepPerfCurrentESs OBJECT-TYPE
    SYNTAX          PerfCurrentCount
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The counter associated with the number of Errored
        Seconds encountered."
    ::= { pwVcCepPerfCurrentEntry 16 }
```

```
pwVcCepPerfCurrentSESSs OBJECT-TYPE
    SYNTAX          PerfCurrentCount
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The counter associated with the number of
        Severely Errored Seconds encountered."
    ::= { pwVcCepPerfCurrentEntry 17 }
```

```
pwVcCepPerfCurrentUASSs OBJECT-TYPE
    SYNTAX          PerfCurrentCount
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "The counter associated with the number of
        Unavailable Seconds encountered."
    ::= { pwVcCepPerfCurrentEntry 18 }
```

```
pwVcCepPerfCurrentFC OBJECT-TYPE
    SYNTAX          PerfCurrentCount
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "CEP Failure Counts (FC-CEP). The number of CEP failure
        events. A failure event begins when the LOPS failure
```

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```
is declared, and ends when the failure is cleared. A
failure event that begins in one period and ends in
another period is counted only in the period in which
it begins."
```

```
::= { pwVcCepPerfCurrentEntry 19 }
```

-- End PW CEP VC Performance Current Interval Table

-- PW CEP VC Performance Interval Table.

```
pwVcCepPerfIntervalTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF PwVcCepPerfIntervalEntry
```

MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION

"This table provides per CEP VC performance information much like the pwVcCepPerfCurrentTable above. However, these counts represent historical 15 minute intervals. Typically, this table will have a maximum of 96 entries for a 24 hour period, but is not limited to this.  
NOTE: Counter64 objects are used here, Counter32 is too small for OC-768 CEP VCs."

::= { pwVcCepObjects 5 }

pwVcCepPerfIntervalEntry OBJECT-TYPE

SYNTAX PwVcCepPerfIntervalEntry  
MAX-ACCESS not-accessible  
STATUS current  
DESCRIPTION

"An entry in this table is created by the agent for every pwVcCepPerfCurrentEntry that is 15 minutes old. The contents of the Current entry are copied to the new entry here. The Current entry, then resets its counts to zero for the next current 15 minute interval. pwVcCepIndex is found in the pwVcCepCfg table."

INDEX { pwVcIndex, pwVcCepPerfIntervalNumber }

::= { pwVcCepPerfIntervalTable 1 }

PwVcCepPerfIntervalEntry ::= SEQUENCE {  
pwVcCepPerfIntervalNumber Unsigned32,  
pwVcCepPerfIntervalValidData TruthValue,  
pwVcCepPerfIntervalReset INTEGER,  
pwVcCepPerfIntervalTimeElapsed Integer32,  
  
pwVcCepPerfIntervalDbainPacketsHC Counter64,  
pwVcCepPerfIntervalDbainOutPacketsHC Counter64,  
  
pwVcCepPerfIntervalInNegPtrAdjust Counter32,  
pwVcCepPerfIntervalInPosPtrAdjust Counter32,  
pwVcCepPerfIntervalInPtrAdjustSecs Counter32,  
pwVcCepPerfIntervalOutNegPtrAdjust Counter32,

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pwVcCepPerfIntervalOutPosPtrAdjust Counter32,  
pwVcCepPerfIntervalOutPtrAdjustSecs Counter32,  
pwVcCepPerfIntervalAbsPtrAdjust Integer32,  
  
pwVcCepPerfIntervalMissingPkts Counter32,  
pwVcCepPerfIntervalPktsOoseq Counter32,



pwVcCepPerfIntervalPktsOoRngDropped	Counter32,
pwVcCepPerfIntervalJtrBfrUnderruns	Counter32,
pwVcCepPerfIntervalPktsBadLength	Counter32,
pwVcCepPerfIntervalSummaryErrors	Counter32,
pwVcCepPerfIntervalESS	PerfIntervalCount,
pwVcCepPerfIntervalSESS	PerfIntervalCount,
pwVcCepPerfIntervalUASS	PerfIntervalCount,
pwVcCepPerfIntervalFC	PerfIntervalCount
}	

pwVcCepPerfIntervalNumber OBJECT-TYPE

SYNTAX Unsigned32  
 MAX-ACCESS not-accessible  
 STATUS current

DESCRIPTION

"A number (normally between 1 and 96 to cover a 24 hour period) which identifies the interval for which the set of statistics is available. The interval identified by 1 is the most recently completed 15 minute interval, and the interval identified by N is the interval immediately preceding the one identified by N-1. The minimum range of N is 1 through 4. The default range is 1 through 32. The maximum value of N is 1 through 96."

::= { pwVcCepPerfIntervalEntry 1 }

pwVcCepPerfIntervalValidData OBJECT-TYPE

SYNTAX TruthValue  
 MAX-ACCESS read-only  
 STATUS current

DESCRIPTION

"This variable indicates if the data for this interval is valid."

::= { pwVcCepPerfIntervalEntry 2 }

pwVcCepPerfIntervalReset OBJECT-TYPE

SYNTAX INTEGER {  
 reset (1),  
 normal(2)  
 }

MAX-ACCESS read-create  
 STATUS current

DESCRIPTION

"Used in cases where the user knows that the errors within this interval should not be counted. Writing 'reset' sets all error counts to zero."

::= { pwVcCepPerfIntervalEntry 3 }

## pwVcCepPerfIntervalTimeElapsed OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"The duration of a particular interval in seconds, Adjustments in the system's time-of-day clock, may cause the interval to be greater or less than, the normal value. Therefore this actual interval value is provided."

::= { pwVcCepPerfIntervalEntry 4 }

## pwVcCepPerfIntervalDbainPacketsHC OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"Number of DBA packets received."

::= { pwVcCepPerfIntervalEntry 5 }

## pwVcCepPerfIntervalDbainOutPacketsHC OBJECT-TYPE

SYNTAX Counter64

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"Number of DBA packets sent."

::= { pwVcCepPerfIntervalEntry 6 }

## -- Pointer adjustment stats

## pwVcCepPerfIntervalInNegPtrAdjust OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"Number of negative pointer adjustments sent on the SONET path based on CEP pointer adjustments received."

::= { pwVcCepPerfIntervalEntry 7 }

## pwVcCepPerfIntervalInPosPtrAdjust OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

## DESCRIPTION

"Number of positive pointer adjustments sent on the SONET path based on CEP pointer adjustments received."

::= { pwVcCepPerfIntervalEntry 8 }

## pwVcCepPerfIntervalInPtrAdjustSecs OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of seconds in which a pos or neg pointer

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adjustment was sent on the SONET path."  
 ::= { pwVcCepPerfIntervalEntry 9 }

pwVcCepPerfIntervalOutNegPtrAdjust OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of negative pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."  
 ::= { pwVcCepPerfIntervalEntry 10 }

pwVcCepPerfIntervalOutPosPtrAdjust OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of positive pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."  
 ::= { pwVcCepPerfIntervalEntry 11 }

pwVcCepPerfIntervalOutPtrAdjustSecs OBJECT-TYPE

SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Number of seconds in which a pos or neg pointer  
adjustment was seen on the SONET path."  
 ::= { pwVcCepPerfIntervalEntry 12 }

pwVcCepPerfIntervalAbsPtrAdjust OBJECT-TYPE

SYNTAX Integer32  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Absolute Pointer adjustments is relative adjustment  
drifts between inbound and outbound streams. It is  
calculated as absolute value of :  
( InPosPtrAdjust - InNegPtrAdjust) -  
( OutPosPtrAdjust - OutNegPtrAdjust) "  
 ::= { pwVcCepPerfIntervalEntry 13 }

pwVcCepPerfIntervalMissingPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of missing packets (as detected via CEP header sequence number gaps)."

::= { pwVcCepPerfIntervalEntry 14 }

pwVcCepPerfIntervalPkts0oseq OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

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STATUS current

DESCRIPTION

"Number of packets detected out of sequence (via CEP header sequence numbers), but successfully re-ordered. Note: some implementations may not support this feature (see pwVcCepCfgPktReorder)."

::= { pwVcCepPerfIntervalEntry 15 }

pwVcCepPerfIntervalPkts0oRngDropped OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets detected out of range (via CEP header sequence numbers), and could not be re-ordered, or could not fit in the jitter buffer."

::= { pwVcCepPerfIntervalEntry 16 }

pwVcCepPerfIntervalJtrBfrUnderruns OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of times a packet needed to be played out and the jitter buffer was empty."

::= { pwVcCepPerfIntervalEntry 17 }

pwVcCepPerfIntervalPktsBadLength OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets received larger or smaller than

```
pwVcCepCfgNormalPktLength."  
 ::= { pwVcCepPerfIntervalEntry 18 }
```

pwVcCepPerfIntervalSummaryErrors OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"A summary of all the packet error types above (from missing packets to bad length packets)."

```
 ::= { pwVcCepPerfIntervalEntry 19 }
```

pwVcCepPerfIntervalESs OBJECT-TYPE

```
SYNTAX      PerfIntervalCount  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of Errored Seconds encountered."

```
 ::= { pwVcCepPerfIntervalEntry 20 }
```

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pwVcCepPerfIntervalSESSs OBJECT-TYPE

```
SYNTAX      PerfIntervalCount  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of Severely Errored Seconds encountered."

```
 ::= { pwVcCepPerfIntervalEntry 21 }
```

pwVcCepPerfIntervalUASs OBJECT-TYPE

```
SYNTAX      PerfIntervalCount  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of Unavailable Seconds encountered."

```
 ::= { pwVcCepPerfIntervalEntry 22 }
```

pwVcCepPerfIntervalFC OBJECT-TYPE

```
SYNTAX      PerfIntervalCount  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"CEP Failure Counts (FC-CEP). The number of CEP failure events. A failure event begins when the LOPS failure

is declared, and ends when the failure is cleared. A failure event that begins in one period and ends in another period is counted only in the period in which it begins."

::= { pwVcCepPerfIntervalEntry 23 }

-- End PW CEP VC Performance Interval Table

-- PW CEP VC Total Performance Table

pwVcCepPerfTotalTable OBJECT-TYPE

SYNTAX SEQUENCE OF PwVcCepPerfTotalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"This table provides per CEP VC performance information much like the pwVcCepPerfIntervalTable above. However, these counts represent complete historical information.

NOTE: Counter64 objects are used here, Counter32 is too small for OC-768 CEP VCs."

::= { pwVcCepObjects 6 }

pwVcCepPerfTotalEntry OBJECT-TYPE

SYNTAX PwVcCepPerfTotalEntry

MAX-ACCESS not-accessible

STATUS current

DESCRIPTION

"An entry is created in this table by the agent for

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every entry in the pwVcCep table."

INDEX { pwVcIndex }

::= { pwVcCepPerfTotalTable 1 }

PwVcCepPerfTotalEntry ::= SEQUENCE {

pwVcCepPerfTotalDbainPacketsHC Counter64,

pwVcCepPerfTotalDbainOutPacketsHC Counter64,

pwVcCepPerfTotalInNegPtrAdjust Counter32,

pwVcCepPerfTotalInPosPtrAdjust Counter32,

pwVcCepPerfTotalInPtrAdjustSecs Counter32,

pwVcCepPerfTotalOutNegPtrAdjust Counter32,

pwVcCepPerfTotalOutPosPtrAdjust Counter32,

pwVcCepPerfTotalOutPtrAdjustSecs Counter32,

pwVcCepPerfTotalAbsPtrAdjust Integer32,

```

pwVcCepPerfTotalMissingPkts      Counter32,
pwVcCepPerfTotalPkts0oseq        Counter32,
pwVcCepPerfTotalPkts0oRngDropped Counter32,
pwVcCepPerfTotalJtrBfrUnderruns  Counter32,
pwVcCepPerfTotalPktsBadLength    Counter32,
pwVcCepPerfTotalSummaryErrors    Counter32,

pwVcCepPerfTotalESS               Counter32,
pwVcCepPerfTotalSESS              Counter32,
pwVcCepPerfTotalUASS              Counter32,
pwVcCepPerfTotalIFC               Counter32,
pwVcCepPerfTotalDiscontinuityTime TimeStamp
}

```

pwVcCepPerfTotalDbainPacketsHC OBJECT-TYPE

```

SYNTAX      Counter64
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Number of DBA packets received."
 ::= { pwVcCepPerfTotalEntry 1 }

```

pwVcCepPerfTotalDbainOutPacketsHC OBJECT-TYPE

```

SYNTAX      Counter64
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION
    "Number of DBA packets sent."
 ::= { pwVcCepPerfTotalEntry 2 }

```

-- Pointer adjustment stats

pwVcCepPerfTotalInNegPtrAdjust OBJECT-TYPE

```

SYNTAX      Counter32
MAX-ACCESS  read-only

```

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```

STATUS      current
DESCRIPTION
    "Number of negative pointer adjustments sent on the
    SONET path based on CEP pointer adjustments received."
 ::= { pwVcCepPerfTotalEntry 3 }

```

pwVcCepPerfTotalInPosPtrAdjust OBJECT-TYPE

```

SYNTAX      Counter32
MAX-ACCESS  read-only
STATUS      current
DESCRIPTION

```

"Number of postive pointer adjustments sent on the  
SONET path based on CEP pointer adjustments received."  
::= { pwVcCepPerfTotalEntry 4 }

pwVcCepPerfTotalInPtrAdjustSecs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of seconds in which a pos or neg pointer  
adjustment was sent on the SONET path."

::= { pwVcCepPerfTotalEntry 5 }

pwVcCepPerfTotalOutNegPtrAdjust OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of negative pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."

::= { pwVcCepPerfTotalEntry 6 }

pwVcCepPerfTotalOutPosPtrAdjust OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of positive pointer adjustments seen on the  
SONET path and encoded onto sent CEP packets."

::= { pwVcCepPerfTotalEntry 7 }

pwVcCepPerfTotalOutPtrAdjustSecs OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of seconds in which a pos or neg pointer  
adjustment was seen on the SONET path."

::= { pwVcCepPerfTotalEntry 8 }

pwVcCepPerfTotalAbsPtrAdjust OBJECT-TYPE

SYNTAX Integer32

MAX-ACCESS read-only

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STATUS current

DESCRIPTION

"Absolute Pointer adjustments is relative adjustment



drifts between inbound and outbound streams. It is calculated as absolute value of :

$$\begin{aligned} & ( \text{InPosPtrAdjust} - \text{InNegPtrAdjust} ) - \\ & ( \text{OutPosPtrAdjust} - \text{OutNegPtrAdjust} ) \end{aligned} \quad "$$

::= { pwVcCepPerfTotalEntry 9 }

pwVcCepPerfTotalMissingPkts OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of missing packets (as detected via CEP header sequence number gaps)."

::= { pwVcCepPerfTotalEntry 10 }

pwVcCepPerfTotalPktsOoseq OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets detected out of sequence (via CEP header sequence numbers), but successfully re-ordered. Note: some implementations may not support this feature (see pwVcCepCfgPktReorder)."

::= { pwVcCepPerfTotalEntry 11 }

pwVcCepPerfTotalPktsOoRngDropped OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets detected out of range (via CEP header sequence numbers), and could not be re-ordered, or could not fit in the jitter buffer."

::= { pwVcCepPerfTotalEntry 12 }

pwVcCepPerfTotalJtrBfrUnderruns OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of times a packet needed to be played out and the jitter buffer was empty."

::= { pwVcCepPerfTotalEntry 13 }

pwVcCepPerfTotalPktsBadLength OBJECT-TYPE

SYNTAX Counter32

MAX-ACCESS read-only

STATUS current

DESCRIPTION

"Number of packets received larger or smaller than

```
    pwVcCepCfgNormalPktLength."  
 ::= { pwVcCepPerfTotalEntry 14 }
```

pwVcCepPerfTotalSummaryErrors OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"A summary of all the packet error types above (from missing packets to bad length packets)."

```
 ::= { pwVcCepPerfTotalEntry 15 }
```

pwVcCepPerfTotalESs OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of Errored Seconds encountered. See future versions of [draft-malis-pwe3-sonet-02.txt](#) for definition of ES."

```
 ::= { pwVcCepPerfTotalEntry 16 }
```

pwVcCepPerfTotalSESSs OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of Severely Errored Seconds. See pwVcCepCfgMissingPktsToSes. Also see future versions of [draft-malis-pwe3-sonet](#) for definition."

```
 ::= { pwVcCepPerfTotalEntry 17 }
```

pwVcCepPerfTotalUASs OBJECT-TYPE

```
SYNTAX      Counter32  
MAX-ACCESS  read-only  
STATUS      current
```

DESCRIPTION

"The counter associated with the number of UnAvailable Seconds. See pwVcCepCfgSesToUAS.

NOTE: When first entering the UAS state, the number of SesToUas is added to this object, then as each additional UAS occurs, this object increments by one.

NOTE: Similar to [RFC 2558](#), If the agent chooses to update

the various performance statistics in real time then it must be prepared to retroactively reduce the ES, SES, counts (by the value of pwVcCepCfgSesToUas) and increase the UAS count (by that same value) when it determines that UAS state has been entered."

::= { pwVcCepPerfTotalEntry 18 }

pwVcCepPerfTotalFC OBJECT-TYPE

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SYNTAX Counter32  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"CEP Failure Counts (FC-CEP). The number of CEP failure events. A failure event begins when the LOPS failure is declared, and ends when the failure is cleared."

::= { pwVcCepPerfTotalEntry 19 }

pwVcCepPerfTotalDiscontinuityTime OBJECT-TYPE

SYNTAX TimeStamp  
MAX-ACCESS read-only  
STATUS current

DESCRIPTION

"The value of sysUpTime on the most recent occasion at which any one or more of this segment's Counter32 or Counter64 suffered a discontinuity. If no such discontinuities have occurred since the last re-initialization of the local management subsystem, then this object contains a zero value."

::= { pwVcCepPerfTotalEntry 20 }

-- End of PW CEP Total Performance table

-- Notifications - CEP VC

pwVcCepGlobalNotifyEnable OBJECT-TYPE

SYNTAX TruthValue  
MAX-ACCESS read-write  
STATUS current

DESCRIPTION

"If this object is true, then it enables the generation of pwVcCepUp and pwVcCepDown notifications, otherwise these notifications are not emitted.

Note: enabling/disabling notifications for individual CEP VCs is for further study."

```
DEFVAL { false }
 ::= { pwVcCepObjects 8 }
```

```
pwVcCepUp NOTIFICATION-TYPE
 OBJECTS   { pwVcOperStatus }
 STATUS    current
 DESCRIPTION
   "This notification is generated when a CEP VC has
   exited the 'failure' state."
 ::= { pwVcCepNotifyPrefix 1 }
```

```
pwVcCepDown NOTIFICATION-TYPE
 OBJECTS   { pwVcCepLatchedIndications }
 STATUS    current
 DESCRIPTION
```

```
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```

```
"This notification is generated when a CEP VC has
entered the 'failure' state. See description of
LastIndications object."
 ::= { pwVcCepNotifyPrefix 2 }
```

```
-- End of notifications.
```

```
-- Conformance Configuration table
```

```
pwVcCepConformanceCfgTable OBJECT-TYPE
 SYNTAX      SEQUENCE OF PwVcCepConformanceCfgEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
   "This table provides the means for the agent to
   declare whether certain CEP VC statistics objects
   are supported (conformed to) or not. If not
   supported, then the object MUST be return 0."
 ::= { pwVcCepObjects 9 }
```

```
pwVcCepConformanceCfgEntry OBJECT-TYPE
 SYNTAX      PwVcCepConformanceCfgEntry
 MAX-ACCESS  not-accessible
 STATUS      current
 DESCRIPTION
   "The agent MUST create a single entry in this table."
```

```
INDEX { pwVcCepConformanceCfgIndex }

 ::= { pwVcCepConformanceCfgTable 1 }
```

```

PwVcCepConformanceCfgEntry ::= SEQUENCE {
    pwVcCepConformanceCfgIndex          INTEGER,

    pwVcCepPerfDbainPacketsHCTruth     TruthValue,
    pwVcCepPerfDbainPacketsHCDesc     SnmpAdminString,

    pwVcCepPerfDbainPacketsHCTruth     TruthValue,
    pwVcCepPerfDbainPacketsHCDesc     SnmpAdminString,

    pwVcCepPerfPktsOoseqTruth          TruthValue,
    pwVcCepPerfPktsOoseqDesc          SnmpAdminString,

    pwVcCepPerfPktsOoRngDroppedTruth   TruthValue,
    pwVcCepPerfPktsOoRngDroppedDesc   SnmpAdminString,

    pwVcCepPerfSummaryErrorsTruth     TruthValue,
    pwVcCepPerfSummaryErrorsDesc     SnmpAdminString
}

```

```

pwVcCepConformanceCfgIndex OBJECT-TYPE
    SYNTAX          INTEGER (0..128)
    MAX-ACCESS      not-accessible

```

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```

STATUS          current
DESCRIPTION
    "Any arbitrary number"
 ::= { pwVcCepConformanceCfgEntry 1 }

```

```

pwVcCepPerfDbainPacketsHCTruth OBJECT-TYPE
    SYNTAX          TruthValue
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "Tells whether the pwVcCepPerf...DbainPacketsHC
         in the pwVcCepPerf...Table is supported."
 ::= { pwVcCepConformanceCfgEntry 2 }

```

```

pwVcCepPerfDbainPacketsHCDesc OBJECT-TYPE
    SYNTAX          SnmpAdminString
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "Explanation for pwVcCepPerf...DbainPacketsHC
         support in the pwVcCepPerf...Table."
 ::= { pwVcCepConformanceCfgEntry 3 }

```

```

pwVcCepPerfDbainPacketsHCTruth OBJECT-TYPE
    SYNTAX          TruthValue

```

MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Tells whether the pwVcCepPerf...DbasOutPacketsHC  
in the pwVcCepPerf...Table is supported."  
::= { pwVcCepConformanceCfgEntry 4 }

pwVcCepPerfDbasOutPacketsHCDesc OBJECT-TYPE  
SYNTAX SnmpAdminString  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Explanation for pwVcCepPerf...DbasOutPacketsHC  
support in the pwVcCepPerf...Table."  
::= { pwVcCepConformanceCfgEntry 5 }

pwVcCepPerfPktsOoseqTruth OBJECT-TYPE  
SYNTAX TruthValue  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Tells whether the pwVcCepPerf...PktsOoseq  
in the pwVcCepPerf...Table is supported."  
::= { pwVcCepConformanceCfgEntry 6 }

pwVcCepPerfPktsOoseqDesc OBJECT-TYPE  
SYNTAX SnmpAdminString  
MAX-ACCESS read-only  
STATUS current

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DESCRIPTION  
"Explanation for pwVcCepPerf...PktsOoseq  
support in the pwVcCepPerf...Table."  
::= { pwVcCepConformanceCfgEntry 7 }

pwVcCepPerfPktsOoRngDroppedTruth OBJECT-TYPE  
SYNTAX TruthValue  
MAX-ACCESS read-only  
STATUS current  
DESCRIPTION  
"Tells whether the pwVcCepPerf...PktsOoRngDropped  
in the pwVcCepPerf...Table is supported."  
::= { pwVcCepConformanceCfgEntry 8 }

pwVcCepPerfPktsOoRngDroppedDesc OBJECT-TYPE  
SYNTAX SnmpAdminString  
MAX-ACCESS read-only

```
STATUS          current
DESCRIPTION
    "Explanation for pwVcCepPerf...PktsOoRngDropped
    support in the pwVcCepPerf...Table."
 ::= { pwVcCepConformanceCfgEntry 9 }
```

```
pwVcCepPerfSummaryErrorsTruth OBJECT-TYPE
SYNTAX          TruthValue
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "Tells whether the pwVcCepPerf...SummaryError
    in the pwVcCepPerf...Table is supported."
 ::= { pwVcCepConformanceCfgEntry 10 }
```

```
pwVcCepPerfSummaryErrorsDesc OBJECT-TYPE
SYNTAX          SnmpAdminString
MAX-ACCESS      read-only
STATUS          current
DESCRIPTION
    "Explanation for pwVcCepPerf...SummaryError
    support in the pwVcCepPerf...Table."
 ::= { pwVcCepConformanceCfgEntry 11 }
```

-- End of CEP VC Conformance Configuration table

-- Conformance Information

-- Note: Conformance at the object access and values level is  
-- still FFS, therefore current conformance is defined at the  
-- object existence level only.

```
pwVcCepGroups          OBJECT IDENTIFIER ::= { pwVcCepConformance 1 }
pwVcCepCompliances    OBJECT IDENTIFIER ::= { pwVcCepConformance 2 }
```

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```
pwCepModuleCompliance MODULE-COMPLIANCE
STATUS current
DESCRIPTION
    "The compliance statement for agent that support PW
    over CEP PSN operation."

MODULE -- this module
MANDATORY-GROUPS { pwVcCepGroup,
```

```

        pwVcCepCfgGroup,
        pwVcCepPerfCurrentGroup,
        pwVcCepPerfIntervalGroup,
        pwVcCepPerfTotalGroup,
        pwVcCepEventGroup,
        pwVcCepConformanceCfgGroup
    }
    ::= { pwVcCepCompliances 1 }

-- Units of conformance.

pwVcCepGroup OBJECT-GROUP
    OBJECTS {
        pwVcCepType,
        pwVcCepSonetIfIndex,
        pwVcCepSonetTimeSlot,
        pwVcCepSonetConfigError,
        pwVcCepCfgIndex,
        pwVcCepTimeElapsed,
        pwVcCepValidIntervals,
        pwVcCepCurrentIndications,
        pwVcCepLatchedIndications,
        pwVcCepLastEsTimeStamp
    }
    STATUS current
    DESCRIPTION
        "Collection of objects for basic CEP VC config and
        status."
    ::= { pwVcCepGroups 1 }

```

```

pwVcCepCfgGroup OBJECT-GROUP
    OBJECTS {
        pwVcCepCfgIndexNext,

        pwVcCepConfigError,

        pwVcCepCfgNormalPktLength,
        pwVcCepCfgMinPktLength,
        pwVcCepCfgPktReorder,
        pwVcCepCfgEnableDBA,

        pwVcCepCfgJtrBfrDepth,
        pwVcCepCfgJtrBfrRebuildOor,
    }

```

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```

        pwVcCepCfgJtrBfrRebuildOorCount,

        pwVcCepCfgConsecPktsInsync,
    }

```



```

    pwVcCepCfgConsecMissingOutSync,

    pwVcCepCfgPktErrorPlayOutValue,

    pwVcCepCfgMissingPktsToSes,
    pwVcCepCfgSesToUas,
    pwVcCepCfgSecsToExitUas,

    pwVcCepCfgRowStatus,
    pwVcCepCfgStorageType
}
STATUS current
DESCRIPTION
    "Collection of detailed objects needed to
    configure CEP VCs."
::= { pwVcCepGroups 2 }

```

pwVcCepPerfCurrentGroup OBJECT-GROUP

```

OBJECTS {
    pwVcCepPerfCurrentDbainPacketsHC,
    pwVcCepPerfCurrentDbainOutPacketsHC,

    pwVcCepPerfCurrentInNegPtrAdjust,
    pwVcCepPerfCurrentInPosPtrAdjust,
    pwVcCepPerfCurrentInPtrAdjustSecs,
    pwVcCepPerfCurrentOutNegPtrAdjust,
    pwVcCepPerfCurrentOutPosPtrAdjust,
    pwVcCepPerfCurrentOutPtrAdjustSecs,
    pwVcCepPerfCurrentAbsPtrAdjust,

    pwVcCepPerfCurrentMissingPkts,
    pwVcCepPerfCurrentPktsOoseq,
    pwVcCepPerfCurrentPktsOoRngDropped,
    pwVcCepPerfCurrentJtrBfrUnderruns,
    pwVcCepPerfCurrentPktsBadLength,
    pwVcCepPerfCurrentSummaryErrors,

    pwVcCepPerfCurrentESS,
    pwVcCepPerfCurrentSESS,
    pwVcCepPerfCurrentUASS,
    pwVcCepPerfCurrentFC
}
STATUS current
DESCRIPTION
    "Collection of statistics objects for CEP VCs."
::= { pwVcCepGroups 3 }

```

pwVcCepPerfIntervalGroup OBJECT-GROUP

```

OBJECTS {

```

```
    pwVcCepPerfIntervalValidData,
    pwVcCepPerfIntervalReset,
    pwVcCepPerfIntervalTimeElapsed,

    pwVcCepPerfIntervalDbainPacketsHC,
    pwVcCepPerfIntervalDbainPacketsHC,

    pwVcCepPerfIntervalInNegPtrAdjust,
    pwVcCepPerfIntervalInPosPtrAdjust,
    pwVcCepPerfIntervalInPtrAdjustSecs,
    pwVcCepPerfIntervalOutNegPtrAdjust,
    pwVcCepPerfIntervalOutPosPtrAdjust,
    pwVcCepPerfIntervalOutPtrAdjustSecs,
    pwVcCepPerfIntervalAbsPtrAdjust,

    pwVcCepPerfIntervalMissingPkts,
    pwVcCepPerfIntervalPktsOoSeq,
    pwVcCepPerfIntervalPktsOoRngDropped,
    pwVcCepPerfIntervalJtrBfrUnderruns,
    pwVcCepPerfIntervalPktsBadLength,
    pwVcCepPerfIntervalSummaryErrors,

    pwVcCepPerfIntervalESS,
    pwVcCepPerfIntervalSESS,
    pwVcCepPerfIntervalUASS,
    pwVcCepPerfIntervalFC,

    pwVcCepGlobalNotifyEnable
}
STATUS current
DESCRIPTION
    "Collection of statistics objects for CEP VCs."
 ::= { pwVcCepGroups 4 }
```

pwVcCepPerfTotalGroup OBJECT-GROUP

```
OBJECTS {
    pwVcCepPerfTotalDbainPacketsHC,
    pwVcCepPerfTotalDbainPacketsHC,

    pwVcCepPerfTotalInNegPtrAdjust,
    pwVcCepPerfTotalInPosPtrAdjust,
    pwVcCepPerfTotalInPtrAdjustSecs,
    pwVcCepPerfTotalOutNegPtrAdjust,
    pwVcCepPerfTotalOutPosPtrAdjust,
    pwVcCepPerfTotalOutPtrAdjustSecs,
    pwVcCepPerfTotalAbsPtrAdjust,
```

```
pwVcCepPerfTotalMissingPkts,  
pwVcCepPerfTotalPktsOoseq,  
pwVcCepPerfTotalPktsOoRngDropped,  
pwVcCepPerfTotalJtrBfrUnderruns,  
pwVcCepPerfTotalPktsBadLength,  
pwVcCepPerfTotalSummaryErrors,
```

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```
pwVcCepPerfTotalESS,  
pwVcCepPerfTotalSESS,  
pwVcCepPerfTotalUASS,  
pwVcCepPerfTotalFC,  
pwVcCepPerfTotalDiscontinuityTime  
}
```

STATUS current

DESCRIPTION

"Collection of statistics objects for CEP VCs."

::= { pwVcCepGroups 5 }

pwVcCepEventGroup NOTIFICATION-GROUP

NOTIFICATIONS {

```
pwVcCepUp,  
pwVcCepDown
```

}

STATUS current

DESCRIPTION

"Collection of event objects for CEP VCs."

::= { pwVcCepGroups 7 }

pwVcCepConformanceCfgGroup OBJECT-GROUP

OBJECTS {

```
pwVcCepPerfDbainPacketsHCTruth,  
pwVcCepPerfDbainPacketsHCDesc,
```

```
pwVcCepPerfDbainOutPacketsHCTruth,  
pwVcCepPerfDbainOutPacketsHCDesc,
```

```
pwVcCepPerfPktsOoseqTruth,  
pwVcCepPerfPktsOoseqDesc,
```

```
pwVcCepPerfPktsOoRngDroppedTruth,  
pwVcCepPerfPktsOoRngDroppedDesc,
```

```
pwVcCepPerfSummaryErrorsTruth,  
pwVcCepPerfSummaryErrorsDesc
```

}

```
STATUS current
DESCRIPTION
    "Collection of objects declaring conformance to
    other objects."
 ::= { pwVcCepGroups 8 }
```

END

```
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```

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#### Acknowledgement

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