A YANG Data Model of Performance Management Streaming

(draft-yoon-ccamp-pm-streaming-01)

ETRI

Bin Yeong Yoon

Major Changes (from Ver.00 to Ver.01)

- Splitting the YANG Data Module (pm-streaming) into Two Modules (pm-measurements and pm-parameters) for flexibility
  - pm-measurements module:
    - Define periodic measurement modes (Count, snapshot, tidemark) and notifications of threshold events
  - pm-parameters module:
    - Defines three parameter groups classified by time intervals (15 minutes, 24 hours) and their respective use cases (management, service)
- Add some text in Clause 4: Decoupling Collection from Analytics for SBI

Updated YANG Modules

(Ver. 00)

```
module: ietf-pm-streaming
  +--rw pm-periodic-measurement
     +--rw measurement-interval?   uint32
     +--rw maintenance-15min
     |  +--rw pm-parameter* [parameter-name]
     |     +--rw parameter-name          maintenance-parameters
     |     +--rw count-measurement
     |     |  +--ro count-value?                  uint32
     |     |  +--ro count-unit?                   parameter-unit
     |     |  +--rw transient-condition-config
     |     |  |  +--rw high-oor-threshold?   uint32
     |     |  |  +--                         uint32
     |     |  +--rw                                g
     |     |     +--rw standing-threshold?          uint32
     |     |     +--rw standing-reset-threshold?    uint32
     |     +--rw snapshot-measurement
     |     |  +--rw uniform-time?          uint32
     |     |  +--ro snapshot-value?        uint32
     |     |  +--ro snapshot-unit?         parameter-unit
     |     |  +--rw high-oor-threshold?    uint32
     |     |  +--rw low-oor-threshold?     uint32
     |     +--rw tidemark-maintenance
     |        +--ro high-tide-value?       uint32
     |        +--ro high-tide-unit?        parameter-unit
     |        +--ro low-tide-value?        uint32
     |        +--ro low-tide-unit?         parameter-unit
     |        +--rw high-oor-threshold?    uint32
     |        +--rw low-oor-threshold?     uint32
     +--rw maintenance-24hr
```

pm-streaming

(Ver. 01)

```
module: ietf-pm-measurements
  +--rw pm-periodic-measurement
     +--rw pm-parameter* [parameter-name]
        +--rw parameter-name          identityref
        +--rw count-measurement
        |  +--ro count-value?                  uint32
        |  +--ro count-unit?                   parameter-unit
        |  +--rw transient-condition-config
        |  |  +--rw high-oor-threshold?   uint32
        |  |  +--rw low-oor-threshold?    uint32
        |  +--rw standing-condition-config
        |     +--                              uint32
        |     +--                              uint32
        +--rw s
        |  +--r
        |  +--ro snapshot-value?        uint32
        |  +--ro snapshot-unit?         parameter-unit
        |  +--rw high-oor-threshold?    uint32
        |  +--rw low-oor-threshold?     uint32
        +--rw tidemark-measurement
           +--ro high-tide-value?       uint32
           +--ro high-tide-unit?        parameter-unit
           +--ro low-tide-value?        uint32
           +--ro low-tide-unit?         parameter-unit
           +--rw high-oor-threshold?    uint32
           +--rw low-oor-threshold?     uint32
```

pm-measurements

```
module: ietf-pm-parameters
  +--rw pm-parameters
     +--rw maintenance-parameters-15min
     |  +--ro es?     uint32
     |  +--ro ses?    uint32
     |  +--ro bbe?    uint32
     |  +--
     |  +--
     +--rw maintenance-parameters-24hr
     |  +--ro es?     uint32
     |  +--ro ses?    uint32
     |  +--ro bbe?    uint32
     |  +--ro bbc?    uint32
     |  +--ro uas?    uint32
     |  +--ro pje?    uint32
     +--rw qos-parameters-24hr
        +--ro es?     uint32
        +--ro ses?    uint32
        +--ro bbe?    uint32
        +--ro bbc?    uint32
        +--ro uas?    uint32
        +--ro sep?    uint32
```

pm-parameters

Updated YANG Module 1 (pm-measurements)

(Ver. 00)

```
module: ietf-pm-streaming
  +--rw pm-periodic-measurement
     +--rw measurement-interval?   uint32
     +--rw maintenance-15min
     |  +--rw pm-parameter* [parameter-name]
     |     +--rw parameter-name          maintenance-parameters
     |     +--rw count-measurement
     |     |  +--ro count-value?                 uint32
     |     |  +--ro count-unit?                  parameter-unit
     |     |  +--rw transient-condition-config
     |     |  |  +--rw high-oor-threshold?   uint32
     |     |  |  +--rw low-oor-threshold?    uint32
     |     |  +--rw standing-condition-config
     |     |     +--rw standing-threshold?         uint32
     |     |     +--rw standing-reset-threshold?   uint32
     |     +--rw snapshot-measurement
     |     |  +--rw uniform-time?         uint32
     |     |  +--ro snapshot-value?       uint32
     |     |  +--ro snapshot-unit?        parameter-unit
     |     |  +--rw high-oor-threshold?   uint32
     |     |  +--rw low-oor-threshold?    uint32
     |     +--rw tidemark-maintenance
     |        +--ro high-tide-value?      uint32
     |        +--ro high-tide-unit?       parameter-unit
     |        +--ro low-tide-value?       uint32
     |        +--ro low-tide-unit?        parameter-unit
     |        +--rw high-oor-threshold?   uint32
     |        +--rw low-oor-threshold?    uint32
     +--rw ma
     |  +--rw
     |     +-
     |     +--rw count-measurement
     |     |  +--ro count-value?          uint32
     |     |  +--ro count-unit?           parameter-unit
     |     |  +--rw transient-condition-config
     |     |     +--rw high-oor-threshold?   uint32
     |     |     +--rw low-oor-threshold?    uint32
     |     +--rw snapshot-measurement
     |     |  +--rw uniform-time?         uint32
     |     |  +--ro snapshot-value?       uint32
     |     |  +--ro snapshot-unit?        parameter-unit
     |     |  +--rw high-oor-threshold?   uint32
     |     |  +--rw low-oor-threshold?    uint32
     |     +--rw tidemark-maintenance
     |        +--ro high-tide-value?      uint32
     |        +--ro high-tide-unit?       parameter-unit
     |        +--ro low-tide-value?       uint32
     |        +--ro low-tide-unit?        parameter-unit
     |        +--rw high-oor-threshold?   uint32
     |        +--rw low-oor-threshold?    uint32
     +--rw qos-24hr
        +--rw pm-parameter* [parameter-name]
           +--rw parameter-name       qos-parameters
           +--rw count-measurement
```

pm-streaming

(Ver. 01)

```
module: ietf-pm-measurements
  +--rw pm-periodic-measurement
     +--rw pm-parameter* [parameter-name]
        +--rw parameter-name          parameter-name
        +--rw count-measurement
        |  +--ro count-value?                 uint32
        |  +--ro count-units?                 parameter-units
        |  +--rw transient-condition-config
        |  |  +--rw high-oor-threshold?   uint32
        |  |  +--rw low-oor-threshold?    uint32
        |  +--rw standing-condition-config
        |     +--rw standing-threshold?         uint32
        |     +--rw standing-reset-threshold?   uint32
        +--rw snapshot-measurement
        |  +--rw
        |  +--ro
        |  +--ro
        |  +--rw high-oor-threshold?   uint32
        |  +--rw low-oor-threshold?    uint32
        +--rw tidemark-measurement
           +--ro high-tide-value?      uint32
           +--ro high-tide-units?      parameter-units
           +--ro low-tide-value?       uint32
           +--ro low-tide-units?       parameter-units
           +--rw high-oor-threshold?   uint32
           +--rw low-oor-threshold?    uint32

  notifications:
    +---n pm-threshold-events
       +--ro periodic-threshold-events
          |  +--ro pm-parameter* [parameter-name]
          |     +--ro parameter-name          parameter-name
          |     +--ro count-transient-event
          |        |  +--ro event-type?       enumeration
          |        |  +--ro event-occurred?   boolean
          |        |  +--ro event-time?       yang:date-and-time
```

pm-measurements

Updated YANG Modul 2 (pm-parameters)

(Ver. 00)

```
module: ietf-pm-streaming
  +--rw pm-periodic-measurement
     +--rw measurement-interval?   uint32
     +--rw maintenance-15min
     |  +--rw pm-parameter* [parameter-name]
     |     +--rw parameter-name          maintenance-parameters
     |     +--rw count-measurement
     |     |  +--ro count-value?                  uint32
     |     |  +--ro count-unit?                   parameter-unit
     |     |  +--rw transient-condition-config
     |     |  |  +--rw high-oor-threshold?   uint32
     |     |  |  +--rw low-oor-threshold?    uint32
     |     |  +--                          onfig
     |     |                                d?          uint32
     |     |     +--rw standing-reset-threshold?   uint32
     |     +--rw snapshot-measurement
     |     |  +--rw uniform-time?          uint32
     |     |  +--ro snapshot-value?        uint32
     |     |  +--ro snapshot-unit?         parameter-unit
     |     |  +--rw high-oor-threshold?    uint32
     |     |  +--rw low-oor-threshold?     uint32
     |     +--rw tidemark-maintenance
     |        +--ro high-tide-value?       uint32
     |        +--ro high-tide-unit?        parameter-unit
     |        +--ro low-tide-value?        uint32
     |        +--ro low-tide-unit?         parameter-unit
     |        +--rw high-oor-threshold?    uint32
     |        +--rw low-oor-threshold?     uint32
     +--rw maintenance-24hr
     +--rw qos-24hr
```

pm-streaming

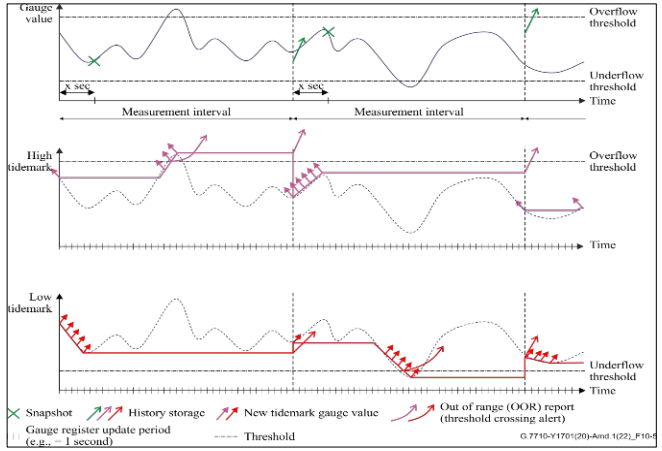
(Ver. 01)

```
module: ietf-pm-parameters
  +--rw pm-parameters
     +--rw maintenance-parameters-15min
     |  +--ro es?    uint32
     |  +--ro ses?   uint32
     |  +--ro bbe?   uint32
     |  +--ro bbc?   uint32
     |  +--ro uas?   uint32
     +--rw maintenance-parameters-24hr
     |  +
     |  +--ro ses?   uint32
     |  +--ro bbe?   uint32
     |  +--ro bbc?   uint32
     |  +--ro uas?   uint32
     |  +--ro pje?   uint32
     +--rw qos-parameters-24hr
        +--ro es?    uint32
        +--ro ses?   uint32
        +--ro bbe?   uint32
        +--ro bbc?   uint32
        +--ro uas?   uint32
        +--ro sep?   uint32
```

pm-parameters

Aligned with ITU-T G.7710

ITU-T SG15 G.7710



(PM Measurement Methods)

		Maintenance (each direction of the transport independently)	Quality of service (Note 1) (both directions of the transport together)
counts	15-minute interval 1 current + 16 recent (Note 2)	ES, SES, BBE, BBC, UAS	
	24-hour interval 1 current + 1 recent	ES, SES, BBE, BBC, UAS, PJE	ES, SES, BBE, BBC, SEP, UAS
events			BUT, EUT, CSES
snapshots	15-minute interval 1 current + 16 recent (Note 2)	gauge value at uniform time	
	24-hour interval 1 current + 1 recent	gauge value at uniform time	
tidemarks	15-minute interval 1 current + 16 recent (Note 2)	gauge highest value, gauge lowest value	
	24-hour interval 1 current + 1 recent	gauge highest value, gauge lowest value	

(PM Parameters)

IETF CCAMP I-D

Workgroup: CCAMP Working Group
Internet-Draft: draft-yoon-ccamp-pm-streaming-00
Published: 20 October 2024
Intended Status: Standards Track
Expires: 23 April 2025
Author: B.Y. Yoon, Ed.
ETRI

A YANG Data Model of Performance Management Streaming

Abstract

This document provides a YANG data model of performance management streaming in network equipment. It defines types of parameters, and their measurements and reporting methods by periodic and event notifications.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 23 April 2025.

Copyright Notice

Copyright (c) 2024 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (https://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Revised BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Revised BSD License.

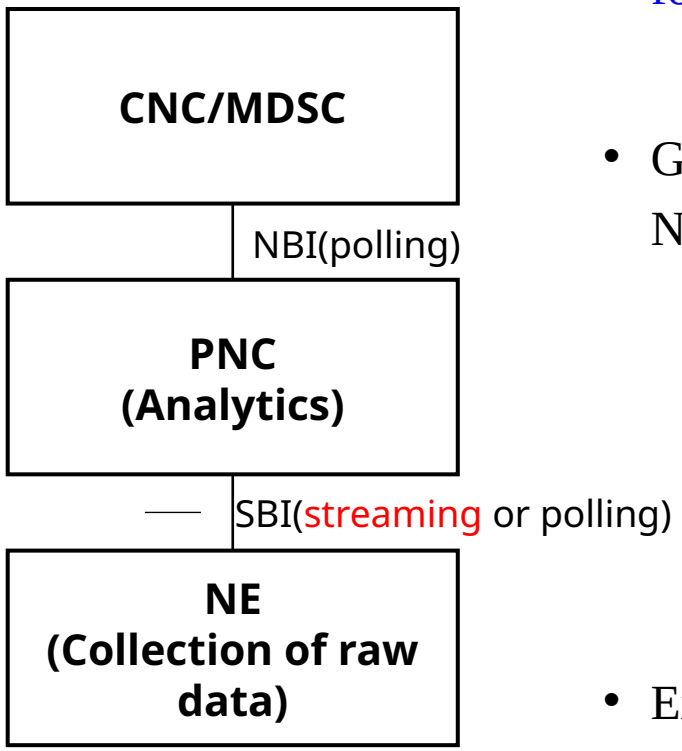
```
module: ietf-pm-measurements
  +--rw pm-periodic-measurement
     +--rw pm-parameter* [parameter-name]
        +--rw parameter-name          identityref
        +--rw count-measurement
        |  +--ro count-value?                  uint32
        |  +--ro count-unit?                   parameter-unit
        |  +--rw transient-condition-config
        |  |  +--rw high-oor-threshold?   uint32
        |  |  +--rw low-oor-threshold?    uint32
        |  +--rw standing-condition-config
        |     +--rw standing-threshold?          uint32
        |     +--rw standing-clear-threshold?    uint32
        +--rw snapshot-measurement
        |  +--rw uniform-time?          uint32
        |  +--ro snapshot-value?        uint32
        |  +--ro snapshot-unit?         parameter-unit
        |  +--rw high-oor-threshold?    uint32
        |  +--rw low-oor-threshold?     uint32
        +--rw tidemark-measurement
           +--ro high-tide-value?       uint32
           +--ro high-tide-unit?        parameter-unit
           +--ro low-tide-value?        uint32
           +--ro low-tide-unit?         parameter-unit
           +--rw high-oor-threshold?    uint32
           +--rw low-oor-threshold?     uint32
```

(PM Measurements Module)

```
module: ietf-pm-parameters
  +--rw pm-parameters
     +--rw maintenance-parameters-15min
     |  +--ro es?     uint32
     |  +--ro ses?    uint32
     |  +--ro bbe?    uint32
     |  +--ro bbc?    uint32
     |  +--ro uas?    uint32
     +--rw maintenance-parameters-24hr
     |  +--ro es?     uint32
     |  +--ro ses?    uint32
     |  +--ro bbe?    uint32
     |  +--ro bbc?    uint32
     |  +--ro uas?    uint32
     |  +--ro pje?    uint32
     +--rw qos-parameters-24hr
        +--ro es?     uint32
        +--ro ses?    uint32
        +--ro bbe?    uint32
        +--ro bbc?    uint32
        +--ro uas?    uint32
        +--ro sep?    uint32
```

(PM Parameters Module)

Decoupling Collection from Analytics (SBI)



- The proposed YANG modules are primarily intended to support pm measurements for SBI (Equipment model, not network model).
  - While optimized for streaming, they remain applicable to polling-based approaches.
- G.7710 recommends Decoupling data Collection (count, snapshot, tidemark) in the NE from data Analytics (average, variance, etc.) in management systems
  - NE is responsible for real-time network monitoring only:
    - Supports lightweight modes: count, snapshot, and tidemark
    - Analytics tasks are offloaded to management applications to enable richer insights
  - Reducing computation burden and memory overhead in NEs
    - Inefficient for all NEs to do analytics in terms of hardware and power consumption
- Except for the three standardized measurement methods, it is unreasonable to support numerous optional or vendor-specific methods within NEs.

Future Works

- Aligned with G.7710 for pm streaming
  - Being revised in ITU-T SG15 (Oct. 2025)
- Use cases
- Update the YANG data modules