Performance Monitoring

Performance monitoring (PM) parameters are used by service providers to gather, store, set thresholds for, and report performance data for early detection of network issues. You can configure and retrieve PM counters for the various controllers in 30 second, 15-minute, or 24-hour flex-bin intervals. These parameters simplify troubleshooting operations and enhance data that can be collected directly from the equipment.

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Configuring PM Parameters

You can configure and view the performance monitoring parameters for the Optics, Ethernet, odu-flex, and coherent DSP controllers.

To configure PM parameters, use the following commands.

configure

show controller *controllertype R/S/I/P* { **pm** { **current | history**} { **30-sec 15-min** | | **24-hour** } { **optics** | **ether** | **fec** | **otn | prbs**} **linenumber** }

commit

Examples

The following is a sample in which the performance monitoring parameters of Optics controller are configured for 24-hour intervals.

```
RP/0/RP0/CPU0:ios#configure
```

```
RP/0/RP0/CPU0:ios(config)#controller optics 0/0/1/5 pm 24-hour optics threshold osnr max
345
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample in which the performance monitoring parameters of the Ethernet controller are configured for 15-minute intervals.

```
RP/0/RP0/CPU0:chassisA164(config)#controller fourHundredGigECtrlr 0/1/0/4 pm 15-min ether
threshold rx-pkt 1
```

The following is a sample in which performance monitoring parameters of Coherent DSP controller are configured for 30-second intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/0/7 pm 30-sec fec threshold post-fec-ber
 max OE-15
RP/0/RP0/CPU0:ios(config)#commit
```

Viewing PM Parameters

To view the performance monitoring parameters for Optics, Ethernet, and Coherent DSP controllers, use the following command:

show controllers *controllertype R/S/I/P* **{ pm { current | history } { 30 sec | 15-min | 24-hour } { optics | ether | fec | otn | prbs}** *linenumber* }

Example 1: The following command displays the current performance monitoring parameters of the Optics controller with 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controller optics 0/1/0/3 pm current 15-min optics 3
Fri Sep 22 13:53:37.120 IST

Optics in the current interval [13:45:00 - 13:53:37 Fri Sep 22 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                        Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[% ]      : 56.8      56.8      56.8     0.0               NA              NO   100.0
          NA               NO
OPT[dBm]     : -40.00    -40.00    -40.00   -30.00            NA              NO   63.32
          NA               NO
OPR[dBm]     : -40.00    -40.00    -40.00   -30.00            NA              NO   63.32
          NA               NO
```

Example 2: The following command displays the current performance monitoring parameters of the client Optics controller with 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controller optics 0/2/0/1 pm current 15-min optics 1
Fri Sep 22 13:56:52.123 IST

Optics in the current interval [13:45:00 - 13:56:52 Fri Sep 22 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                        Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[% ]      : 24.8      25.7      26.7     0.0               NA              NO   100.0
          NA               NO
OPT[dBm]     : -0.12     -0.00     0.11     -30.00            NA              NO   63.32
```

```
          NA               NO
OPR[dBm]      : -0.67     -0.46     -0.24    -30.00            NA               NO    63.32
          NA               NO
```

Example 3: The following command displays the current performance monitoring parameters of the client Ethernet controller with 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/4 pm current 15-min ether
ETHER in the current interval [16:15:00 - 16:18:44 Fri Nov 17 2023]
ETHER current bucket type : Valid
 RX-UTIL[%]               : 0.00                 Threshold : 0.00         TCA(enable) :
NO
 TX-UTIL[%]               : 0.00                 Threshold : 0.00         TCA(enable) :
NO
 RX-PKT                   : 0                    Threshold : 0            TCA(enable) :
NO
 STAT-PKT                 : 0                    Threshold : 0            TCA(enable) :
NO
 OCTET-STAT               : 0                    Threshold : 0            TCA(enable) :
NO
 OVERSIZE-PKT             : 0                    Threshold : 0            TCA(enable) :
NO
 FCS-ERR                  : 0                    Threshold : 0            TCA(enable) :
NO
 LONG-FRAME               : 0                    Threshold : 0            TCA(enable) :
NO
 JABBER-STATS             : 0                    Threshold : 0            TCA(enable) :
NO
 64-OCTET                 : 0                    Threshold : 0            TCA(enable) :
NO
 65-127-OCTET             : 0                    Threshold : 0            TCA(enable) :
NO
 128-255-OCTET            : 0                    Threshold : 0            TCA(enable) :
NO
 256-511-OCTET            : 0                    Threshold : 0            TCA(enable) :
NO
 512-1023-OCTET           : 0                    Threshold : 0            TCA(enable) :
NO
 1024-1518-OCTET          : 0                    Threshold : 0            TCA(enable) :
NO
 IN-UCAST                 : 0                    Threshold : 0            TCA(enable) :
NO
 IN-MCAST                 : 0                    Threshold : 0            TCA(enable) :
NO
 IN-BCAST                 : 0                    Threshold : 0            TCA(enable) :
NO
 OUT-UCAST                : 0                    Threshold : 0            TCA(enable) :
NO
 OUT-BCAST                : 0                    Threshold : 0            TCA(enable) :
NO
 OUT-MCAST                : 0                    Threshold : 0            TCA(enable) :
NO
 TX-PKT                   : 0                    Threshold : 0            TCA(enable) :
NO
 OUT-OCTET                : 0                    Threshold : 0            TCA(enable) :
NO
 IFIN-ERRORS              : 0                    Threshold : 0            TCA(enable) :
NO
 IFIN-OCTETS              : 0                    Threshold : 0            TCA(enable) :
NO
 STAT-MULTICAST-PKT       : 0                    Threshold : 0            TCA(enable) :
NO
 STAT-BROADCAST-PKT       : 0                    Threshold : 0            TCA(enable) :
NO
 STAT-UNDERSIZED-PKT      : 0                    Threshold : 0            TCA(enable) :
```

```
NO
 IN_GOOD_BYTES             : 0                    Threshold : 0            TCA(enable) :
NO
 IN_GOOD_PKTS              : 0                    Threshold : 0            TCA(enable) :
NO
 IN_DROP_OTHER             : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_GOOD_BYTES            : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_GOOD_PKTS             : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKT_64_OCTET           : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKTS_65_127_OCTETS     : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKTS_128_255_OCTETS    : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKTS_256_511_OCTETS    : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKTS_512_1023_OCTETS   : 0                    Threshold : 0            TCA(enable) :
NO
 IN_PKTS_1024_1518_OCTETS  : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKT_64_OCTET          : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKTS_65_127_OCTETS    : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKTS_128_255_OCTETS   : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKTS_256_511_OCTETS   : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKTS_512_1023_OCTETS  : 0                    Threshold : 0            TCA(enable) :
NO
 OUT_PKTS_1024_1518_OCTETS : 0                    Threshold : 0            TCA(enable) :
NO
 TX_UNDERSIZED_PKT         : 0                    Threshold : 0            TCA(enable) :
NO
 TX_OVERSIZED_PKT          : 0                    Threshold : 0            TCA(enable) :
NO
 TX_JABBER                 : 0                    Threshold : 0            TCA(enable) :
NO
 TX_BAD_FCS                : 0                    Threshold : 0            TCA(enable) :
NO
```

Example 4: The following command displays the current performance monitoring for FEC for the Coherent DSP controller for FEC 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controller coherentDSP 0/2/0/0 pm current 15-min fec
Fri Sep 22 14:02:19.236 IST

g709 FEC in the current interval [14:00:00 - 14:02:19 Fri Sep 22 2023]

FEC current bucket type : Valid
    EC-BITS   : 545156378205            Threshold : 5400000000000          TCA(enable)  :
YES
    UC-WORDS  : 0                       Threshold : 5                      TCA(enable)  :
YES

                                      MIN       AVG        MAX      Threshold      TCA
 Threshold     TCA
                                                                        (min)     (enable)
   (max)     (enable)
PreFEC BER                    :   5.19E-03   5.36E-03   6.09E-03      0E-15        NO
   0E-15        NO
PostFEC BER                   :     0E-15     0E-15     0E-15      0E-15        NO
```

```
0E-15        NO
Q[dB]                          :      8.10      8.10      8.10          0.00        NO
    0.00        NO
Q_Margin[dB]                   :      2.10      2.10      2.10          0.00        NO
    0.00        NO
Instantaneous Q_Margin [dB]    :      1.70      1.77      1.80          0.00        NO
    0.00        NO
```

Example 5: The following command displays the current performance monitoring parameters for PRBS of the Coherent DSP controller with 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/7 pm current 15-min prbs
Mon Feb 13 00:58:48.327 UTC
PRBS in the current interval [00:45:00 - 00:58:48 Mon Feb 13 2019]
PRBS current bucket type : Valid
EBC : 40437528165
FOUND-COUNT : 1 FOUND-AT-TS : 00:51:22 Mon Feb 13 2019
LOST-COUNT : 1 LOST-AT-TS : 00:52:52 Mon Feb 13 2019
CONFIG-PTRN : PRBS_PATTERN_PN31
Last clearing of "show controllers OTU" counters never
```

Example 6: The following command displays the current performance monitoring of PCS of the Ethernet controller with 30-second intervals:

```
RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 0/1/0/2/1 pm current 30-sec pcs
Fri Sep 22 14:04:33.676 IST

Ethernet PCS in the current interval [14:04:30 - 14:04:33 Fri Sep 22 2023]

Ethernet PCS current bucket type : Valid
 BIP[00]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[01]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[02]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[03]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[04]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[05]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[06]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[07]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[08]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[09]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[10]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[11]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[12]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[13]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[14]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[15]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[16]                    : 0                          Threshold : 0
    TCA(enable) : NO
 BIP[17]                    : 0                          Threshold : 0
```

```
   TCA(enable) : NO
BIP[18]                    : 0                          Threshold : 0
   TCA(enable) : NO
BIP[19]                    : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[00]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[01]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[02]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[03]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[04]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[05]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[06]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[07]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[08]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[09]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[10]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[11]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[12]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[13]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[14]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[15]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[16]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[17]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[18]                : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[19]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[00]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[01]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[02]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[03]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[04]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[05]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[06]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[07]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[08]                 : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[09]                 : 0                          Threshold : 0
```

```
   TCA(enable) : NO
 BAD-SH[10]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[11]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[12]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[13]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[14]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[15]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[16]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[17]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[18]                : 0                          Threshold : 0
   TCA(enable) : NO
 BAD-SH[19]                : 0                          Threshold : 0
   TCA(enable) : NO
 ES                        : 0                          Threshold : 0
   TCA(enable) : NO
 SES                       : 0                          Threshold : 0
   TCA(enable) : NO
 UAS                       : 0                          Threshold : 0
   TCA(enable) : NO
 ES-FE                     : 0                          Threshold : 0
   TCA(enable) : NO
 SES-FE                    : 0                          Threshold : 0
   TCA(enable) : NO
 UAS-FE                    : 0                          Threshold : 0
   TCA(enable) : NO
```

Example 7: The following command displays the history performance monitoring of PCS of the Ethernet controller with 30-second intervals:

```
RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 0/1/0/2/1 pm history 30-sec pcs 1
Fri Sep 22 14:06:14.193 IST

Ethernet PCS in the current interval [14:05:30 - 14:06:00 Fri Sep 22 2023]

Ethernet PCS current bucket type : Valid
 BIP[00]                   : 0
 BIP[01]                   : 0
 BIP[02]                   : 0
 BIP[03]                   : 0
 BIP[04]                   : 0
 BIP[05]                   : 0
 BIP[06]                   : 0
 BIP[07]                   : 0
 BIP[08]                   : 0
 BIP[09]                   : 0
 BIP[10]                   : 0
 BIP[11]                   : 0
 BIP[12]                   : 0
 BIP[13]                   : 0
 BIP[14]                   : 0
 BIP[15]                   : 0
 BIP[16]                   : 0
 BIP[17]                   : 0
 BIP[18]                   : 0
 BIP[19]                   : 0
 FRM-ERR[00]               : 0
 FRM-ERR[01]               : 0
```

```
 FRM-ERR[02]                : 0
 FRM-ERR[03]                : 0
 FRM-ERR[04]                : 0
 FRM-ERR[05]                : 0
 FRM-ERR[06]                : 0
 FRM-ERR[07]                : 0
 FRM-ERR[08]                : 0
 FRM-ERR[09]                : 0
 FRM-ERR[10]                : 0
 FRM-ERR[11]                : 0
 FRM-ERR[12]                : 0
 FRM-ERR[13]                : 0
 FRM-ERR[14]                : 0
 FRM-ERR[15]                : 0
 FRM-ERR[16]                : 0
 FRM-ERR[17]                : 0
 FRM-ERR[18]                : 0
 FRM-ERR[19]                : 0
 BAD-SH[00]                 : 0
 BAD-SH[01]                 : 0
 BAD-SH[02]                 : 0
 BAD-SH[03]                 : 0
 BAD-SH[04]                 : 0
 BAD-SH[05]                 : 0
 BAD-SH[06]                 : 0
 BAD-SH[07]                 : 0
 BAD-SH[08]                 : 0
 BAD-SH[09]                 : 0
 BAD-SH[10]                 : 0
 BAD-SH[11]                 : 0
 BAD-SH[12]                 : 0
 BAD-SH[13]                 : 0
 BAD-SH[14]                 : 0
 BAD-SH[15]                 : 0
 BAD-SH[16]                 : 0
 BAD-SH[17]                 : 0
 BAD-SH[18]                 : 0
 BAD-SH[19]                 : 0
 ES                         : 0
 SES                        : 0
 UAS                        : 0
 ES-FE                      : 0
 SES-FE                     : 0
 UAS-FE                     : 0
```

Example 8: The following command displays the current performance monitoring parameters of the trunk optics controller with 10-second intervals as flexi-bin:

```
RP/0/RP0/CPU0:ios#show controllers optics 0/1/0/0 pm current flex-bin optics 1
Fri Sep 22 14:08:37.001 IST

Optics in the current interval [14:08:30 - 14:08:36 Fri Sep 22 2023]

Flexible bin interval size: 10 seconds

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                          Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[% ]      : 0.0       0.0       0.0      0.0              NA              NO    0.0
          NA               NO
OPT[dBm]     : -1.53     -1.49     -1.45    0.00             NA              NO    0.00
          NA               NO
OPR[dBm]     : -1.62     -1.61     -1.57    0.00             NA              NO    0.00
```

```
          NA                NO
CD[ps/nm]     : 2         2         3         0                 NA                NO    0
          NA                NO
DGD[ps ]      : 3.00      3.00      3.00      0.00              NA                NO    0.00
          NA                NO
SOPMD[ps^2]   : 9.00      21.57     40.00     0.00              NA                NO    0.00
          NA                NO
OSNR[dB]      : 37.90     37.90     37.90     0.00              NA                NO    0.00
          NA                NO
PDL[dB]       : 1.10      1.10      1.10      0.00              NA                NO    0.00
          NA                NO
PCR[rad/s]    : 0.00      26.29     93.00     0.00              NA                NO    0.00
          NA                NO
RX_SIG[dBm]   : -2.14     -2.09     -2.05     0.00              NA                NO    0.00
          NA                NO
FREQ_OFF[Mhz]: 873        902       938       0                 NA                NO    0
          NA                NO
SNR[dB]       : 20.90     20.97     21.10     0.00              NA                NO    0.00
          NA                NO
SNR-AX[dB]    : 20.90     21.00     21.10     0.00              NA                NO    0.00
          NA                NO
SNR-AY[dB]    : 20.90     20.99     21.00     0.00              NA                NO    0.00
          NA                NO
SNR-BX[dB]    : 19.20     19.40     19.60     0.00              NA                NO    0.00
          NA                NO
SNR-BY[dB]    : 19.30     19.40     19.50     0.00              NA                NO    0.00
          NA                NO
SOP-S1        : 0.00      1.09      2.55      0.00              NA                NO    0.00
          NA                NO
SOP-S2        : 0.31      0.32      0.33      0.00              NA                NO    0.00
          NA                NO
SOP-S3        : 0.94      0.94      0.94      0.00              NA                NO    0.00
          NA                NO
```

Example 9: The following command displays the history performance monitoring parameters of the trunk optics controller with 10-second intervals as flexi-bin.

```
RP/0/RP0/CPU0:ios#show controllers optics 0/1/0/0 pm history flex-bin optics 1 bucket 1
Fri Sep 22 14:09:54.425 IST

Optics in interval 1 [14:09:40 - 14:09:50 Fri Sep 22 2023]

Flexible bin interval size: 10 seconds

Optics history bucket type : Valid
              MIN       AVG       MAX
LBC[% ]     : 0.0       0.0       0.0
OPT[dBm]    : -1.52     -1.49     -1.47
OPR[dBm]    : -1.63     -1.59     -1.55
CD[ps/nm]   : 1         1         2
DGD[ps ]    : 2.00      2.70      3.00
SOPMD[ps^2]: 4.00       14.00     27.00
OSNR[dB]    : 37.90     37.90     37.90
PDL[dB]     : 1.10      1.10      1.10
PCR[rad/s]  : 0.00      16.00     96.00
RX_SIG[dBm] : -2.13     -2.08     -2.02
FREQ_OFF[Mhz]: 833       870       916
SNR[dB]    : 20.80     20.94     21.10
SNR-AX[dB]: 20.80      20.97     21.10
SNR-AY[dB]: 20.90      20.93     21.10
SNR-BX[dB]: 19.30      19.42     19.50
SNR-BY[dB]: 19.20      19.42     19.50
SOP-S1     : 0.00      1.53      2.55
SOP-S2     : 0.30      0.32      0.33
SOP-S3     : 0.94      0.94      0.95
```

Example 10: The following command displays the current performance monitoring parameters of the coherentDSP controller as flexi-bin:

```
RP/0/0/CPU0:ios#show controllers coherentDSP 0/1/0/0 pm current flex-bin fec
Fri Sep 22 14:11:11.213 IST

g709 FEC in the current interval [14:11:10 - 14:11:10 Fri Sep 22 2023]

Flexible bin interval size: 10 seconds

FEC current bucket type : Valid
    EC-BITS   : 2532544513              Threshold : 0                     TCA(enable)  :
NO
    UC-WORDS  : 0                       Threshold : 0                     TCA(enable)  :
NO

                                       MIN       AVG        MAX      Threshold      TCA
 Threshold     TCA
                                                                        (min)     (enable)
   (max)     (enable)
PreFEC BER                     :   3.39E-03   3.44E-03   3.59E-03      0E-15        NO
   0E-15        NO
PostFEC BER                    :     0E-15     0E-15     0E-15      0E-15        NO
0E-15        NO
Q[dB]                          :      8.60      8.60      8.60          0.00        NO
    0.00        NO
Q_Margin[dB]                   :      2.60      2.60      2.60          0.00        NO
    0.00        NO
Instantaneous Q_Margin [dB]    :      2.30      2.30      2.30          0.00        NO
    0.00        NO
```

Example 11: The following command displays the current performance monitoring FEC parameters of the coherentDSP OTN with 15-minute intervals:

```
show controllers coherentDSP 0/0/0/7 pm current 15-min otn
Fri Nov 17 16:33:50.820 UTC
g709 OTN in the current interval [16:30:00 - 16:33:50 Fri Nov 17 2023]
OTN current bucket type : Valid
    ES-NE   : 0         Threshold : 500      TCA(enable)  : YES
    ESR-NE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    SES-NE  : 0         Threshold : 500      TCA(enable)  : YES
    SESR-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-NE  : 0         Threshold : 500      TCA(enable)  : YES
    BBE-NE  : 0         Threshold : 10000    TCA(enable)  : YES
    BBER-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-NE   : 0         Threshold : 10       TCA(enable)  : YES

    ES-FE   : 0         Threshold : 500      TCA(enable)  : YES
    ESR-FE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    SES-FE  : 0         Threshold : 500      TCA(enable)  : YES
    SESR-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-FE  : 0         Threshold : 500      TCA(enable)  : YES
    BBE-FE  : 0         Threshold : 10000    TCA(enable)  : YES
    BBER-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-FE   : 0         Threshold : 10       TCA(enable)  : YES
```

Example 12: The following command displays the current performance monitoring for OTN parameters of the ODU-Flex with 15-minute intervals:

```
RP/0/RP0/CPU0:ios#show controllers odu-flEX 0/0/0/7/4 pm current 15-min otn pathmonitor
Fri Nov 17 16:44:34.849 UTC
g709 OTN in the current interval [16:30:00 - 16:44:34 Fri Nov 17 2023]
OTN current bucket type : Valid
    ES-NE   : 0         Threshold : 87       TCA(enable)  : YES
    ESR-NE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
```

```
    SES-NE  : 0         Threshold : 1        TCA(enable)  : YES
    SESR-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-NE  : 0         Threshold : 3        TCA(enable)  : YES
    BBE-NE  : 0         Threshold : 85040    TCA(enable)  : YES
    BBER-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-NE   : 0         Threshold : 10       TCA(enable)  : YES

    ES-FE   : 0         Threshold : 87       TCA(enable)  : YES
    ESR-FE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    SES-FE  : 0         Threshold : 1        TCA(enable)  : YES
    SESR-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-FE  : 0         Threshold : 3        TCA(enable)  : YES
    BBE-FE  : 0         Threshold : 85040    TCA(enable)  : YES
    BBER-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-FE   : 0         Threshold : 10       TCA(enable)  : YES
```

Example 13: Displays the current performance monitoring parameters of the coherentDSP with 15-minute intervals FEC:

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/7 pm current 15-min fec
Fri Nov 17 16:16:05.276 UTC

g709 FEC in the current interval [16:15:00 - 16:16:05 Fri Nov 17 2023]

FEC current bucket type : Valid
    EC-BITS   : 19795040790             Threshold : 5400000000000          TCA(enable)  :
YES
    UC-WORDS  : 0                       Threshold : 5                      TCA(enable)  :
YES

                                        MIN       AVG        MAX      Threshold      TCA
 Threshold     TCA
                                                                          (min)      (enable)
   (max)     (enable)
PreFEC BER                      :   2.70E-04   2.79E-04   2.88E-04      0E-15        NO
   0E-15        NO
PostFEC BER                     :     0E-15     0E-15     0E-15      0E-15        NO
0E-15        NO
Q[dB]                           :     10.70     10.70     10.70          0.00        NO
    0.00        NO
Q_Margin[dB]                    :      4.40      4.45      4.50          0.00        NO
    0.00        NO
Instantaneous Q_Margin [dB]     :      4.40      4.45      4.50          0.00        NO
    0.00        NO
```

Example 14: The following command displays the current performance monitoring parameters of the Ethernet controller with 15-minute intervals for FEC.

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/1 pm current 15-min fec

Ethernet FEC in the current interval [11:30:00 - 11:31:00 Mon Oct 30 2023]

FEC current bucket type : Valid
    EC-WORDS  : 8406                    Threshold : 0                      TCA(enable)  :
NO
    UC-WORDS  : 0                       Threshold : 0                      TCA(enable)  :
NO
```

Example 15: The following command displays the current performance monitoring parameters of the trunk optics with 15-minute intervals.

```
RP/0/RP0/CPU0:ios#show controllers optics 0/0/0/7 pm current 15-min optics 1
Optics in the current interval [16:00:00 - 16:11:43 Fri Nov 17 2023]
Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
```

```
      Configured     TCA
                                          Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[% ]      : 0.0       0.0       0.0      5.0               NA               NO   85.0
          NA               NO
OPT[dBm]     : 1.96      2.01      2.04     -12.01            NA               NO   4.00
          NA               NO
OPR[dBm]     : -0.55     -0.46     -0.35    -14.09            NA               NO   11.00
          NA               NO
CD[ps/nm]    : -1        0         0        -9700             NA               NO   46560
          NA               NO
DGD[ps ]     : 0.00      1.00      1.00     0.00              NA               NO   81.00
          NA               NO
SOPMD[ps^2]  : 2.00      24.45     93.00    0.00              NA               NO   60000.00
         NA               NO
OSNR[dB]     : 37.90     39.11     40.70    21.50             NA               NO   99.00
          NA               NO
PDL[dB]      : 1.70      1.91      2.10     0.00              NA               NO   3.00
          NA               NO
PCR[rad/s]   : 0.00      0.00      0.00     0.00              NA               NO   2500000.00
       NA               NO
RX_SIG[dBm]  : -1.07     -0.78     -0.64    -15.09            NA               NO   3.00
          NA               NO
FREQ_OFF[Mhz]: -112      -51       14       -3200             NA               NO   3200
          NA               NO
SNR[dB]      : 17.20     17.48     17.70    0.00              NA               NO   100.00
          NA               NO
SNR-X[dB]    : 17.40     17.67     18.00    0.00              NA               NO   300.00
         NA               NO
SNR-Y[dB]    : 17.00     17.31     17.60    0.00              NA               NO   300.00
         NA               NO
SOP-S1       : 0.00      0.00      0.00     -1.00             NA               NO   1.00
          NA               NO
SOP-S2       : 0.00      0.00      0.00     -1.00             NA               NO   1.00
          NA               NO
SOP-S3       : 0.00      0.00      0.00     -1.00             NA               NO   1.00
          NA               NO
```

Example 16: Displays the current performance monitoring parameters of the client optics with 15-minute intervals.

```
RP/0/RP0/CPU0:ios#show controllers optics 0/0/0/4 pm current 15-min optics 1
Fri Nov 17 16:13:38.671 UTC

Optics in the current interval [16:00:00 - 16:13:38 Fri Nov 17 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                          Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[% ]      : 83.3      83.3      83.3     0.0               NA               NO   100.0
          NA               NO
OPT[dBm]     : 1.23      1.23      1.23     -2.01             NA               NO   4.00
          NA               NO
OPR[dBm]     : 1.19      1.21      1.24     -5.00             NA               NO   4.00
          NA               NO
```

Example 17: Displays the current performance monitoring parameters of the client with 15-minute intervals PCS.

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/4 pm current 15-min pcs
Ethernet PCS in the current interval [16:15:00 - 16:26:15 Fri Nov 17 2023]
Ethernet PCS current bucket type : Valid
 BIP[00]                    : 0                          Threshold : 0
```

```
   TCA(enable) : NO
BIP[01]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[02]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[03]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[04]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[05]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[06]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[07]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[08]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[09]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[10]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[11]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[12]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[13]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[14]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[15]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[16]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[17]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[18]                    : 0                         Threshold : 0
   TCA(enable) : NO
BIP[19]                    : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[00]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[01]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[02]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[03]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[04]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[05]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[06]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[07]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[08]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[09]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[10]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[11]                : 0                         Threshold : 0
   TCA(enable) : NO
FRM-ERR[12]                : 0                         Threshold : 0
```

```
   TCA(enable) : NO
FRM-ERR[13]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[14]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[15]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[16]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[17]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[18]               : 0                          Threshold : 0
   TCA(enable) : NO
FRM-ERR[19]               : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[00]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[01]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[02]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[03]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[04]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[05]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[06]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[07]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[08]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[09]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[10]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[11]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[12]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[13]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[14]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[15]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[16]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[17]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[18]                : 0                          Threshold : 0
   TCA(enable) : NO
BAD-SH[19]                : 0                          Threshold : 0
   TCA(enable) : NO
ES                        : 0                          Threshold : 0
   TCA(enable) : NO
SES                       : 0                          Threshold : 0
   TCA(enable) : NO
UAS                       : 0                          Threshold : 0
   TCA(enable) : NO
ES-FE                     : 0                          Threshold : 0
   TCA(enable) : NO
SES-FE                    : 0                          Threshold : 0
```

```
    TCA(enable) : NO
 UAS-FE                    : 0                          Threshold : 0
    TCA(enable) : NO
```

Instantaneous Q-Margin

Scenarios on Instantaneous Q-margin

In the following scenarios, the initial few PM buckets are displayed as valid although the instantaneous Q-margin values are displayed as invalid in those buckets. The PM is performed for 30 sec, 15 mins, and 24 hours, respectively.

- Shutdown or no shutdown on optics
- Trunk rate change
- Fiber cut

To overcome such situations, avoid the initial PM bucket readings while monitoring the instantaneous Q-margin values for these scenarios.

The following sample illustrates that the initial PM bucket readings for specified scenarios are invalid and at a later point the PM buckets readings are valid although the instantaneous Q-margin value is invalid.

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/0 pm history flex-bin fec 1
Fri Sep 22 14:17:01.008 IST

g709 FEC in interval 1 [14:16:50 - 14:17:00 Fri Sep 22 2023]

Flexible bin interval size: 10 seconds

FEC history bucket type : Valid
 EC-BITS   : 25615718133              UC-WORDS  : 0

                                MIN                       AVG                       MAX
PreFEC BER              :    3.37E-03                  3.49E-03                  3.90E-03
PostFEC BER             :    0E-15                     0E-15                     0E-15
Q                       :    8.60                      8.60                      8.60
Q_margin                :    2.50                      2.56                      2.60
Instantaneous Q_margin  :    2.20                      2.20                      2.20
```

Now, the PM buckets are valid although the instantaneous Q-margin value is invalid.

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/0 pm history 30-sec fec 1
Sep 22 08:52:03.750 UTC

g709 FEC in interval 1 [08:51:50 - 08:52:00 Fri Sep 22 2023]

FEC history bucket type : Invlid
 EC-BITS   : 35072302421                  UC-WORDS  : 0

                                MIN                       AVG                       MAX
PreFEC BER              :    5.20E-03                  5.30E-03                  5.64E-03
PostFEC BER             :    0E-15                     0E-15                     0E-15
Q                       :    8.10                      8.10                      8.10
Q_margin                :    2.10                      2.10                      2.10
Instantaneous Q_margin  :    1.80                      1.80                      1.80
```

Clearing PM Parameters

To clear the performance monitoring parameters for Ethernet and Coherent DSP controllers, use this command:

clear controller *controllertype R/S/I/P* **pm**

Example 1: Clears the PM parameters on the Coherent DSP controller.

```
RP/0/RP0/CPU0:ios#show controller coherentDSP 0/0/0/0 pm current 15-min fec
Fri Sep 22 14:28:12.100 IST

g709 FEC in the current interval [14:15:00 - 14:28:12 Fri Sep 22 2023]

FEC current bucket type : Valid
    EC-BITS   : 1159814176244           Threshold : 5400000000000          TCA(enable)  :
YES
    UC-WORDS  : 0                       Threshold : 5                      TCA(enable)  :
YES

                                       MIN       AVG        MAX      Threshold      TCA
 Threshold     TCA
                                                                          (min)     (enable)
   (max)     (enable)
PreFEC BER                     :     0E-15   2.14E-03   2.28E-02      0E-15        NO
  0E-15        NO
PostFEC BER                    :     0E-15   1.37E-10   6.59E-08      0E-15        NO
  0E-15        NO
Q[dB]                          :      0.00      4.14      8.60          0.00        NO
    0.00        NO
Q_Margin[dB]                   :     -6.00     -1.89      2.60          0.00        NO
    0.00        NO
Instantaneous Q_Margin [dB]    :   -21474836.48   -28144.25      2.30          0.00
 NO        0.00        NO

Last clearing of "show controllers OTU" counters never
RP/0/RP0/CPU0:ios#clear controller coherentDSP 0/0/0/0 pm
Mon Jun 10 11:44:31.650 UTC
RP/0/RP0/CPU0:ios#show controller coherentDSP 0/0/0/0 pm current 15-min fec
Fri Sep 22 14:30:06.833 IST

g709 FEC in the current interval [14:30:00 - 14:30:06 Fri Sep 22 2023]

FEC current bucket type : Valid
    EC-BITS   : 17889249955             Threshold : 5400000000000          TCA(enable)  :
YES
    UC-WORDS  : 0                       Threshold : 5                      TCA(enable)  :
YES

                                       MIN       AVG        MAX      Threshold      TCA
 Threshold     TCA
                                                                          (min)     (enable)
   (max)     (enable)
PreFEC BER                     :   3.38E-03   3.49E-03   3.85E-03      0E-15        NO
   0E-15        NO
PostFEC BER                    :     0E-15     0E-15     0E-15      0E-15        NO
0E-15        NO
Q[dB]                          :      8.60      8.60      8.60          0.00        NO
    0.00        NO
Q_Margin[dB]                   :      2.50      2.50      2.60          0.00        NO
    0.00        NO
Instantaneous Q_Margin [dB]    :      2.20      2.20      2.20          0.00        NO
    0.00        NO

Last clearing of "show controllers OTU" counters 00:00:07
```

Example 2: To clear the PM parameters on the Ethernet controller, use the following command:.

```
RP/0/RP0/CPU0:ios#clear controller HundredGigECtrlr 0/0/0/2/1 pm
```

Viewing Ethernet Statistics

To view the PM statistics for the Ethernet controllers, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctrlr 0/0/0/4 stats
Fri Nov 17 16:28:34.138 UTC
Statistics for interface FourHundredGigECtrlr0/0/0/4 (cached values):
Ingress:
    Input total bytes           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input good bytes            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input total packets         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input 802.1Q frames         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pause frames          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 64 bytes         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 65-127 bytes     = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 128-255 bytes    = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 256-511 bytes    = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 512-1023 bytes   = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 1024-1518 bytes  = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input pkts 1519-Max bytes   = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input good pkts             = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input unicast pkts          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input multicast pkts        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input broadcast pkts        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop overrun          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop abort            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop invalid VLAN     = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop invalid DMAC     = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop invalid encap    = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input drop other            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error giant           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error runt            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error jabbers         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error fragments       = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error CRC             = 0                     Valid = False        Start time =
```

```
 13:12:29 Fri Nov 17 2023
    Input error collisions      = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error symbol          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input error other           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input MIB giant             = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input MIB jabber            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Input MIB CRC               = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
Egress:
    Output total bytes          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output good bytes           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output total packets        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output 802.1Q frames        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pause frames         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 64 bytes        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 65-127 bytes    = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 128-255 bytes   = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 256-511 bytes   = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 512-1023 bytes  = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 1024-1518 bytes = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output pkts 1519-Max bytes  = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output good pkts            = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output unicast pkts         = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output multicast pkts       = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output broadcast pkts       = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output drop underrun        = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output drop abort           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output drop other           = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
    Output error other          = 0                     Valid = False        Start time =
 13:12:29 Fri Nov 17 2023
```

Note Performance monitoring statistics are not supported for the input unicast packets, output unicast packets, and input error fragments counters for Ethernet clients.

PM History Persistence

PM history parameters for Optics, Ethernet, and coherent DSP controllers are retained even after a line card cold reload, line card warm reload, XR reload, Calvados reload, RP reload, Hw-module all reload, power cycle, or upgrade of the NCS 1014 chassis.

After a software upgrade to the latest release, you can view the history performance monitoring parameters from the previous release. The PM history persistence is supported for 30-second, 15-minute, and 24-hour bucket types.

However, the following list describes the time that is required to fill all historical buckets of each bucket type, later while fetching PM historical data, no error appears.

- For 30-second bucket type, 15 minutes is required to fill 30 historical buckets.
- For 15-minute bucket type, 8 hours is required to fill 32 historical buckets.
- For 24-hour bucket type, 24 hours is required to fill 7 historical bucket.

PM counters are updated continuously in current bucket for all bucket types (flex, 30-second, 15-minute, and 24-hour). After the timer expires for the respective bucket type, the current PM data is moved to the historical PM bucket. This process of moving PM data to the historical bucket is called Rollover. After rollover, you can access the current PM data as historical PM data.

In case of deletion or removal of the controller, the PM data is persistent for 3 hours. Unless the controller is brought up within 3 hours, the PM data is cleared because the controller is considered to be not in use.

Limitations

If NCS 1014 reload happens during the rollover time, one of the following scenarios occurs:

- Complete PM bucket is missing and the next PM bucket is marked as *Invalid*.
- PM bucket expiry message appears as follows:

```
RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 0/3/0/2/2 pm history 30-sec ether
29
Fri Apr  1 01:32:20.646 UTC
History data is empty, Verify at least one collection period is expired
```

- PM bucket interval is marked as *Invalid* and counters are updated as zero.
- PM bucket interval is marked as *Invalid* and counters are updated as nonzero.

Performance Monitoring for NCS1K14-2.4T-X-K9 Card

Performance monitoring (PM) parameters are used by service providers to gather, store, set thresholds for, and report performance data for early detection of network issues. You can configure and retrieve PM counters for 30-second, 15-minute, or 24-hour intervals. These parameters simplify troubleshooting operations and enhance data that can be collected directly from the equipment.

Limitations

On the 2.4TX card in the muxponder mode, PM parameters do not show the Runt and invalid Start Frame Delimiter (SFD) values for the split ports 2 and 3 for 600G and 1000G trunk rates respectively.

Performance Monitoring for NCS1K14-CCMD-16-C and NCS1K14-CCMD-16-L Cards

Table 1: Feature History

Feature Name	Release Information	Feature Description
Supported Functionalities of CCMD-16-C and CCMD-16-L Line Cards	Cisco IOS XR Release 7.11.1	Supported Functionalities of CCMD-16-C and CCMD-16-L Line Cards: The software supports Variable Optical Attenuator (VoA), power monitoring and reporting of parameters to the controllers at the OCH and OMS level. It helps in configuring the amplifier parameters for optimizing signal transmissions. The software also supports in-band and out-of-band tone detection and monitoring and reporting of alarms.

Performance monitoring (PM) parameters are used by service providers to gather, store, set thresholds for, and report performance data for early detection of network issues. You can configure and retrieve PM counters for the OCH and OMS controllers in 30-second, 15-minute, 24-hour intervals or in 10-second flexible bin interval. These parameters simplify troubleshooting operations and enhance data that can be collected directly from the equipment.

PM Parameters Supported on OMS Controller

The PM parameters that are supported on OMS controller are given below.

Table 2: PM Parameters Supported on OMS Controller

Controller	Supported PM Parameters	Description
OMS	OPT (dBm)	Transmitted power
	OPR (dBm)	Received Power
	OPBR (dBm)	Back Reflection Power
	OPBRR (dB)	Back Reflection Ratio
	EAGN (dB)	Egress Ampli Gain
	EATL (dB)	Egress Ampli Tilt
	IAGN (dB)	Ingress Ampli Gain
	IATL (dB)	Ingress Ampli Tilt

PM Parameters Supported on OCH Controller

The PM parameters that are supported on OCH controller are given below.

Controller	Supported PM Parameters	Description
OCH	OPT (dBm) OPR (dBm)	Transmitted Power Received Power

Configuring PM Parameters for NCS1K14-CCMD-16-C and NCS1K14-CCMD-16-L Cards

You can configure and view the performance monitoring parameters for the OMS and OCH controllers.

To configure minimum and maximum threshold for individual parameters, use the following commands.

configure

controller *controllertype R/S/I/P* **pm** {**30-sec** | **15-min** | **24-hour**} **optics threshold** { **parameter-name**} {**max**|**min**} {**value**}

commit

To enable reporting of threshold crossing alarms for individual parameters, use the following commands.

configure

controller *controllertype R/S/I/P* **pm** {**30-sec** | **15-min** | **24-hour**} **optics report** { **parameter-name**} {**min-tca**|**max-tca**}

commit

Examples

The following is a sample with the performance monitoring parameters of OMS controller.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:(config)#controller oms 0/1/0/0 pm 30-sec optics threshold opt min < value >
RP/0/RP0/CPU0:ios(config)#commit
```

The following is a sample with the performance monitoring parameters of OCH controller

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:(config)#controller och 0/1/0/1 pm 30-sec optics threshold opt min < value >
RP/0/RP0/CPU0:ios(config)#commit
```

Viewing PM Parameters

To view the performance monitoring parameters for OMS and OCH controllers, use this command:

show controllers *controllertype R/S/I/P* **pm { current | history } { 30 sec | 15-min | 24-hour | flex-bin } optics** { *linenumber* }

Examples for viewing PM parameters for OMS controller are given below:

Example 1

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers oms 0/1/0/0 pm current 30-sec optics 1

Optics in the current interval [15:02:30 - 15:02:36 Mon Nov 20 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                          Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
OPT[dBm]      : -8.30     -8.24     -8.20    -50.00            NA              NO   30.00
          NA              NO
OPR[dBm]      : -1.80     -1.76     -1.60    -50.00            NA              NO   30.00
          NA              NO
OPBR[dBm]     : -11.61    -11.61    -11.61   -50.00             NA              NO   -10.00
           NA              NO
OPBRR[dB]     : -3.30     -3.30     -3.30    -50.00             NA              NO   0.00
           NA              NO
EAGN[dB]      : 2.00      2.00      2.00     -3.00              NA              NO   22.00
           NA              NO
EATL[dB]      : 0.00      0.00      0.00     -6.50              NA              NO   6.50
           NA              NO
IAGN[dB]      : 5.00      5.00      5.00     0.00               NA              NO   10.00
           NA              NO
IATL[dB]      : 0.00      0.00      0.00     -6.50              NA              NO   6.50
           NA              NO

Last clearing of "show controllers OPTICS" counters never
```

Example 2

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers oms 0/1/0/0 pm current 15-min optics 1

Optics in the current interval [15:00:00 - 15:03:18 Mon Nov 20 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                          Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
OPT[dBm]      : -8.30     -8.23     -8.20    -50.00            NA              NO   30.00
          NA              NO
OPR[dBm]      : -1.80     -1.60     -1.30    -50.00            NA              NO   30.00
          NA              NO
OPBR[dBm]     : -11.61    -11.61    -11.61   -50.00             NA              NO   -10.00
           NA              NO
OPBRR[dB]     : -3.40     -3.34     -3.30    -50.00             NA              NO   0.00
           NA              NO
EAGN[dB]      : 2.00      2.00      2.00     -3.00              NA              NO   22.00
           NA              NO
EATL[dB]      : 0.00      0.00      0.00     -6.50              NA              NO   6.50
           NA              NO
IAGN[dB]      : 5.00      5.00      5.00     0.00               NA              NO   10.00
           NA              NO
IATL[dB]      : 0.00      0.00      0.00     -6.50              NA              NO   6.50
           NA              NO

Last clearing of "show controllers OPTICS" counters never
```

Example 3

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers oms 0/1/0/0 pm current flex-bin optics 1

Optics in the current interval [15:03:40 - 15:03:44 Mon Nov 20 2023]

Flexible bin interval size: 10 seconds
```

```
Optics current bucket type : Valid
MIN AVG MAX Operational Configured TCA Operational Configured TCA
Threshold(min) Threshold(min) (min) Threshold(max) Threshold(max) (max)
OPT[dBm] : -8.30 -8.22 -8.20 0.00 NA NO 0.00 NA NO
OPR[dBm] : -1.50 -1.50 -1.50 0.00 NA NO 0.00 NA NO
OPBR[dBm] : -11.61 -11.61 -11.61 0.00 NA NO 0.00 NA NO
OPBRR[dB] : -3.40 -3.38 -3.30 0.00 NA NO 0.00 NA NO
EAGN[dB] : 2.00 2.00 2.00 0.00 NA NO 0.00 NA NO
EATL[dB] : 0.00 0.00 0.00 0.00 NA NO 0.00 NA NO
IAGN[dB] : 5.00 5.00 5.00 0.00 NA NO 0.00 NA NO
IATL[dB] : 0.00 0.00 0.00 0.00 NA NO 0.00 NA NO

Last clearing of "show controllers OPTICS" counters never
```

Example 4

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers oms 0/1/0/0 pm current 24-hour optics 1

Optics in the current interval [00:00:00 - 15:04:07 Mon Nov 20 2023]

Optics current bucket type : Valid
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                        Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
OPT[dBm]      : -8.30     -8.27     -8.20    -50.00            NA              NO   30.00
          NA              NO
OPR[dBm]      : -3.00     -1.62     -0.20    -50.00            NA              NO   30.00
          NA              NO
OPBR[dBm]     : -11.61    -11.61    -11.51   -50.00             NA              NO   -10.00
           NA              NO
OPBRR[dB]     : -3.40     -3.31     -3.30    -50.00             NA              NO   0.00
           NA              NO
EAGN[dB]      : 2.00      2.00      2.00     -3.00              NA              NO   22.00
           NA              NO
EATL[dB]      : 0.00      0.00      0.10     -6.50              NA              NO   6.50
           NA              NO
IAGN[dB]      : 5.00      5.00      5.00     0.00               NA              NO   10.00
           NA              NO
IATL[dB]      : 0.00      0.00      0.00     -6.50              NA              NO   6.50
           NA              NO

Last clearing of "show controllers OPTICS" counters never
```

Examples for viewing PM parameters for OCH controller are given below:

Example 1

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers och 0/1/0/2 pm current 30-sec optics 1

Optics in the current interval [15:04:30 - 15:04:39 Mon Nov 20 2023]

Optics current bucket type : Valid
MIN AVG MAX Operational Configured TCA Operational Configured TCA
Threshold(min) Threshold(min) (min) Threshold(max) Threshold(max) (max)
OPT[dBm] : -1.40 -1.36 -1.30 -50.00 NA NO 30.00 NA NO
OPR[dBm] : -5.80 -5.71 -5.70 -50.00 NA NO 30.00 NA NO
```

Example 2

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers och 0/1/0/2 pm current 15-min optics 1

Optics in the current interval [15:00:00 - 15:05:03 Mon Nov 20 2023]

Optics current bucket type : Valid
```

```
MIN AVG MAX Operational Configured TCA Operational Configured TCA
Threshold(min) Threshold(min) (min) Threshold(max) Threshold(max) (max)
OPT[dBm] : -1.80 -1.50 -1.30 -50.00 NA NO 30.00 NA NO
OPR[dBm] : -5.80 -5.75 -5.70 -50.00 NA NO 30.00 NA NO

Last clearing of "show controllers OPTICS" counters never
```

Example 3

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers och 0/1/0/2 pm current flex-bin optics 1

Optics in the current interval [15:05:20 - 15:05:28 Mon Nov 20 2023]

Flexible bin interval size: 10 seconds

Optics current bucket type : Valid
MIN AVG MAX Operational Configured TCA Operational Configured TCA
Threshold(min) Threshold(min) (min) Threshold(max) Threshold(max) (max)
OPT[dBm] : -1.40 -1.36 -1.30 0.00 NA NO 0.00 NA NO
OPR[dBm] : -5.80 -5.73 -5.70 0.00 NA NO 0.00 NA NO

Last clearing of "show controllers OPTICS" counters never
```

Example 4

```
RP/0/RP0/CPU0:Tethys_P2A_DT_03#show controllers och 0/1/0/2 pm current 24-hour optics 1

Optics in the current interval [00:00:00 - 15:06:11 Mon Nov 20 2023]

Optics current bucket type : Valid
MIN AVG MAX Operational Configured TCA Operational Configured TCA
Threshold(min) Threshold(min) (min) Threshold(max) Threshold(max) (max)
OPT[dBm] : -3.00 -1.58 -0.10 -50.00 NA NO 30.00 NA NO
OPR[dBm] : -5.80 -5.76 -5.70 -50.00 NA NO 30.00 NA NO

Last clearing of "show controllers OPTICS" counters never
```

Viewing PM History Parameters

To view the performance monitoring parameters for OMS and OCH controllers, use this command:

show controllers *controllertype R/S/I/P* **pm history { 30 sec | 15-min | 24-hour } optics** { *linenumber* }

Example

```
RP/0/RP0/CPU0:Tethys_P2A_DT_02#show controllers oms 0/3/0/0 pm history 30-sec optics 1
bucket 1
Wed Dec 6 11:04:50.821 UTC

Optics in interval 1 [11:04:00 - 11:04:30 Wed Dec 6 2023]

Optics history bucket type : Valid
MIN AVG MAX
OPT[dBm]     : -8.30     -8.27     -8.20
OPR[dBm]     : -3.00     -1.62     -0.20
OPBR[dBm]     : -11.61    -11.61    -11.51
OPBRR[dB]     : -3.40     -3.31     -3.30
EAGN[dB]      : 2.00      2.00      2.00
EATL[dB]      : 0.00      0.00      0.10
IAGN[dB]      : 5.00      5.00      5.00
IATL[dB]      : 0.00      0.00      0.00
```