



Performance Monitoring

This chapter describes the procedures to configure and view the performance monitoring parameters.

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Performance Monitoring

Table 1: Feature History

Feature Name	Release Information	Feature Description
Performance Monitoring Enhancements	Cisco IOS XR Release 24.4.1	You can now view historical Performance Monitoring (PM) parameters for the past 1 to 7 days for the 24-hour interval on these controllers: • CoherentDSP • Ethernet • ODU-layer This feature enhances data collection directly from the equipment, providing a comprehensive view of performance over time. Parameter added: • bucket <i>value</i>

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.



Note Downgrade to 7.11.1 or earlier releases from 24.1.1 can lead to a restart of the pm_collector process. To avoid this, clear the PM historical data before the downgrade using these commands:

```
process shutdown pm_collector
run
cd /misc/config
rm chkpt_pm_collector_*
exit
```

Use these commands if you are already experiencing a continuous pm_collector restart.

```
process shutdown pm_collector
run
cd /misc/config
rm chkpt_pm_collector_*
exit
process start pm_collector
```

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

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

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

RP/0/RP0/CPU0:RINode1#configure
Tue Feb 25 17:52:54.320 IST
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 24-hour optics threshold opr min
-30
RP/0/RP0/CPU0:RINode1(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
```

```
RP/0/RP0/CPU0:RINode1#configure
Tue Feb 25 17:51:18.353 IST
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 15-min optics threshold opr min -30
```

```
RP/0/RP0/CPU0:RINode1(config)#commit
Tue Feb 25 17:52:02.504 IST
```

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

RP/0/RP0/CPU0:RINode1#configur
Tue Feb 25 17:48:00.789 IST
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 ?
  apply-group          Apply configuration from a group
  exclude-group        Exclude apply-group configuration from a group
  pm                   Configure pm parameters
  rx-low-threshold      Configure transponder low receive power threshold
  sec-admin-state       Configure the secondary admin state of och controller
  shutdown             Disable och controller processing
  tone-detect-oob       Configure tone detect oob
  tone-pattern-expected Configure Tone Pattern Expected
  tone-rate             Configure bit rate
  tx-low-threshold      Configure transponder low transmit power threshold
  <cr>
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm ?
  15-min  Configure pm parameters of 15 minute interval
  24-hour Configure pm parameters of 24 hour interval
  30-sec  Configure pm parameters of 30 second interval
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec ?
  optics Configure och optics layer performance monitoring
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec optics ?
  report  set och optics layer TCA reporting status
  threshold Configure threshold on och optics layer parameters
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec optics threshold ?
  opr  set opr threshold in dBm
  opt  set opt threshold in dBm
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec optics threshold opr ?
  max  set opr max threshold in dBm
  min  set opr min threshold in dBm
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec optics threshold opr min ?
  <-5000,+6633> Enter 4 digit value ;Input value 3000 for 30.00dbm
RP/0/RP0/CPU0:RINode1(config)#controller och 0/5/0/8 pm 30-sec optics threshold opr min -30

RP/0/RP0/CPU0:RINode1(config)#commit
Tue Feb 25 17:50:01.632 IST
```

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 }
```

```
show controllers controllertype R/S/I/P { pm { current | history } { 30 sec | 15-min | 24-hour } { optics } 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(max) (max)
      Threshold(min)  Threshold(min) (min) Threshold(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
```

```
RP/0/RP0/CPU0:RINode1#show controllers och 0/5/0/8 pm current 15-min optics 1
Tue Feb 25 17:55:28.915 IST
```

Optics in the current interval [17:45:00 - 17:55:28 Tue Feb 25 2025]

```
Optics current bucket type : Valid
      MIN      AVG      MAX      Operational      Configured      TCA      Operational
      Configured      TCA
      Threshold(max) (max)
      Threshold(min)  Threshold(min) (min) Threshold(max)
OPT[dBm]      : -50.00    -50.00    -50.00    -30.00      NA      NO      15.00
      NA      NO
OPR[dBm]      : -2.59     -2.59     -2.59     -28.00      NA      NO      8.00
      NA      NO
```

Last clearing of "show controllers OPTICS" counters never

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(max) (max)
      Threshold(min)  Threshold(min) (min) Threshold(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 fourHundredGigEctr1r 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

Threshold      TCA          MIN      AVG      MAX      Threshold      TCA
(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

RP/0/RP0/CPU0:RINode1#show controllers oms 0/5/0/33 pm current 30-sec optics 1
Tue Feb 25 17:56:39.462 IST

```

Optics in the current interval [17:56:30 - 17:56:39 Tue Feb 25 2025]

```
Optics current bucket type : Valid
      MIN      AVG      MAX      Operational      Configured      TCA      Operational
      Configured      TCA
      Threshold(max) (max)
OPT[dBm]      : -7.90      -7.90      -7.90      -30.00      NA      NO      15.00
      NA      NO
OPR[dBm]      : -0.60      -0.60      -0.60      -28.00      NA      NO      8.00
      NA      NO
```

Last clearing of "show controllers OPTICS" counters never

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

```

Threshold	TCA		MIN	AVG	MAX	Threshold (min)	TCA (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

Threshold      TCA      MIN      AVG      MAX      Threshold      TCA
(max)          (enable)                                     (min)          (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 fourHundredGigEctr1r 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 Configured	AVG TCA	MAX	Operational	Configured	TCA	Operational
	Threshold(max)	(max)		Threshold(min)	Threshold(min)	(min)	Threshold(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 Configured	AVG TCA	MAX	Operational	Configured	TCA	Operational
	Threshold(max)	(max)		Threshold(min)	Threshold(min)	(min)	Threshold(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

```

Example 18: Displays the FEC performance monitoring parameters of the Ethernet controllers for various time intervals.

From Release 24.2.11, the **show controllers** command output displays post FEC BER and pre FEC BER for the Ethernet controllers of the 2.4T and 2.4TX cards.

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctr1r 0/1/0/4 pm current flex-bin fec
Mon Dec 18 11:30:29.101 UTC
```

Ethernet FEC in the current interval [11:30:20 - 11:30:28 Mon Dec 18 2023]

Flexible bin interval size: 10 seconds

FEC current bucket type : Valid

```

EC-WORDS   : 11174                               Threshold : 0                               TCA(enable) : NO
UC-WORDS   : 0                                   Threshold : 0                               TCA(enable) : NO

```

	MIN	AVG	MAX	Threshold (min)	TCA (enable)	Threshold (max)	TCA (enable)
PreFEC BER:	2.8E-09	2.9E-09	3.1E-09	0E-15	NO	0E-15	NO
PostFEC BER:	0E-15	0E-15	0E-15	0E-15	NO	0E-15	NO

```
RP/0/RP0/CPU0:ios#show controllers fourHundredGigEctr1r 0/1/0/4 pm history flex-bin fec 1
Mon Dec 18 11:48:04.229 UTC
```

Ethernet FEC in interval 1 [11:47:50 - 11:48:00 Mon Dec 18 2023]

Flexible bin interval size: 10 seconds

FEC history bucket type : Valid

```

EC-WORDS   : 12128
UC-WORDS   : 0

```

	MIN	AVG	MAX
PreFEC BER :	2.6E-09	2.9E-09	3.0E-09
PostFEC BER:	0E-15	0E-15	0E-15

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					

Threshold	TCA		MIN	AVG	MAX	Threshold	TCA
(max)	(enable)					(min)	(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 HundredGigEctr1r 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 fourHundredGigEctr1r 0/0/0/4 stats

Fri Nov 17 16:28:34.138 UTC

Statistics for interface FourHundredGigEctr1r0/0/0/4 (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

Service providers use performance monitoring (PM) parameters to gather performance data, store it, set thresholds, and report it. This helps with early detection of network issues.

You can configure and retrieve PM counters at intervals of 30 seconds, 15 minutes, or 24 hours. These parameters simplify troubleshooting operations and increase the amount of data that can be collected directly from the equipment.

Limitations

In muxponder mode on the 2.4T-X card, PM parameters do not display the Runt or invalid Start Frame Delimiter (SFD) values for split ports 2 and 3 when operating at 600G and 1000G trunk rates, respectively.

Performance monitoring for NCS1K14-CCMD-16-C and NCS1K14-CCMD-16-L cards

Table 2: 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.

Service providers use performance monitoring (PM) parameters to gather and store data, set thresholds, and report performance information for early detection of network issues.

You can configure and retrieve PM counters for the OCH and OMS controllers in 30-second, 15-minute, or 24-hour intervals, or in a flexible 10-second bin interval. These parameters simplify troubleshooting and enhance the value of data collected directly from the equipment.

PM parameters supported on OMS controller

These are the PM parameters supported on the OMS controller.

Table 3: 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

These are the PM parameters supported on the OCH controller.

Controller	Supported PM parameters	Description
OCH	OPT (dBm)	Transmitted Power
	OPR (dBm)	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 } bucketvalue
```

This example shows how to view PM parameters for OMS controller.

Example


```
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(max) (max)      Threshold(min)      Threshold(min) (min) Threshold(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
```

View PM Parameters for OCH Controller

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
```

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 { lanenum  
}][bucket value
```

Example 1

The following example shows how you can view the historical PM parameters on a Coherent DSP controller for the past 2 day for 24-hour interval.

```
RP/0/RP0/CPU0:Node164#show controllers coherentDSP 0/3/0/0 pm history 24-hour fec bucket 2
Sat Oct 19 13:55:13.872 IST
```

```
g709 FEC in interval 2 [00:00:00 - 24:00:00 Thu Oct 17 2024]
```

```
FEC history bucket type : valid
EC-BITS : 10121314105194 UC-WORDS : 0
```

	MIN	AVG	MAX
PreFEC BER	: 1.43E-04	1.51E-04	1.59E-04
PostFEC BER	: 0E-15	0E-15	0E-15
Q	: 11.10	11.19	11.20
Q_margin	: 4.70	4.79	4.80
Instantaneous Q_margin	: 4.69	4.79	4.80

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

Example 2

The following example shows how you can view the historical PM parameters on a OMS controller for the 30 seconds interval.

```
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
```