



Performance Monitoring

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Performance monitoring parameters

A performance monitoring parameter is a network data metric that

- allows service providers to gather, store, set thresholds for, and report network performance statistics,
- supports configurable data collection intervals, such as 30-second, 15-minute, or 24-hour periods, and
- simplifies troubleshooting by enhancing the quality of data collected directly from network equipment.

Service providers can configure and retrieve performance monitoring (PM) counters for various controllers, using intervals that suit operational needs. These parameters provide early detection of network issues, making it easier to maintain the network health and resolve problems quickly.

PM history persistence features

A PM history persistence feature is a performance monitoring capability that

- retains historical performance monitoring data for Optics, Ethernet, and coherent DSP controllers even after a line card reload, power cycle, or chassis upgrade,
- supports multiple time intervals, including 30-second, 15-minute, and 24-hour buckets, and
- provides access to historical PM data across software releases, except on unsupported

From Release 7.7.1, 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 1004 chassis.

After upgrading to a new software release, you can view historical PM data collected in the previous release. However, if new PM parameters are introduced in the upgrade, you may see an error when fetching the data, such as:

```
RP/0/RP0/CPU0:ios#show controllers hundredGigEctr1r 0/0/0/8 pm history 15-min ether 5
Tue Apr  5 22:05:56.750 UTC
pm_display_int_15min_ether_index: bag_decode failed ('bag' detected the 'fatal' condition
'An irresolvable version conflict prevented the specified bag from being decoded')
```

The time required to fill historical buckets is:

- 30-second bucket: 15 minutes (30 buckets)
- 15-minute bucket: 8 hours (32 buckets)
- 24-hour bucket: 24 hours (1 bucket)

PM counters are continuously updated in the current bucket for each interval. At the end of the timer, current data is rolled over into a historical bucket.

If a controller is deleted or removed, PM data is preserved for 3 hours. If the controller isn't restored in that time, the data is cleared.

Limitations

- PM history persistence is not supported on NCS1K4-QXP-K9 systems.
- If a reload occurs during the rollover process on NCS 1004, one of the following can happen:
 - The PM bucket may be missing and the next bucket marked as Invalid.
 - A bucket expiry message appears, for example:


```
History data is empty. Verify at least one collection period is expired
```
 - A bucket interval may be marked Invalid, and counters could be zero or nonzero.

Instantaneous Q-margins

A Q-margin is a performance monitoring metric that

- measures signal quality in optical transmission systems,
- indicates the margin between observed signal quality and the threshold below which errors increase, and
- allows monitoring and troubleshooting of system stability for coherentDSP controllers on supported cards.

From Release 7.3.1 onwards, instantaneous Q-margin is supported for performance monitoring (PM) parameters on coherentDSP controllers for 1.2T and 1.2TL cards. For more information, see the supporting concept documentation.

In certain scenarios, some initial PM buckets can be displayed as valid, although the instantaneous Q-margin values in those buckets are shown as invalid. PM measurements are typically taken over 30 seconds, 15 minutes, and 24 hours intervals.

The following scenarios can cause initial PM buckets to show valid readings, despite instantaneous Q-margin values being invalid:

- Shutdown or no shutdown on optics
- Bit per second (BPS) change on optics
- Trunk rate change
- Fiber cut

To handle such cases, avoid relying on the initial PM buckets when monitoring instantaneous Q-margin values in these scenarios.

Sample output:

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/0 pm history flex-bin fec 1
Mon Sep 14 06:16:03.249 UTC

g709 FEC in interval 1 [06:15:50 - 06:16:00 Mon Sep 14 2020]

Flexible bin interval size: 10 seconds
FEC history bucket type : Invalid. ----- > Instantaneous Q_margin is invalid in this
bucket
  EC-BITS   : 38054                UC-WORDS   : 0

                                MIN                AVG                MAX
PreFEC BER      : 0E-15                3.26E-08           1.43E-07
PostFEC BER     : 0E-15                0E-15              0E-15
Q               : 0.00                 5.73               14.40
Q_margin        : -5.00                -0.69              9.40
Instantaneous Q_margin : -21474836.48           -8589934.59        0.00
```

At later intervals, PM buckets may be valid but instantaneous Q-margin values remain invalid, demonstrating why those initial readings should be disregarded.

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/2/0/0 pm history 30-sec fec 1
Mon Sep 14 06:16:53.490 UTC

g709 FEC in interval 1 [06:16:00 - 06:16:30 Mon Sep 14 2020]

FEC history bucket type : Valid ----- > (Instantaneous Q_margin is invalid but the PM
bucket is valid. So these initial bins can be ignored)
  EC-BITS   : 431887                UC-WORDS   : 0

                                MIN                AVG                MAX
PreFEC BER      : 3.97E-09            4.83E-08           1.51E-07
PostFEC BER     : 0E-15                0E-15              0E-15
Q               : 14.40               14.48              14.60
Q_margin        : 9.30                 9.46               9.60
Instantaneous Q_margin : -21474836.48           -5010784.19        14.42
```

Configure PM parameters

This task describes the steps to configure performance monitoring parameters, which are critical for monitoring device operation and analyzing the health of Optics, Ethernet, and coherent DSP controllers.

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

Table 1: Feature History

Feature Name	Release Information	Feature Description
PM History Persistence	Cisco IOS XR Release 7.7.1	<p>PM history parameters for Optics, Ethernet, and coherent DSP controllers are now retained even after operation disruptive events like:</p> <ul style="list-style-type: none"> • Various reload procedures • Power cycle • Operating system upgrade of the NCS 1004 chassis <p>This functionality maintains prolonged access to performance history that is useful for device health monitoring.</p>



Restriction Current and History PM counters do not support flex and 30 second bucket types for OC192 and STM64 controllers.

Follow these steps to configure PM parameters on Optics, Ethernet, or coherent DSP controllers using CLI commands.

Procedure

Step 1 Configure the controller using the command **configure controller** *controllertype R/S/I/P*

Step 2 Configure the pm parameters using the command **pm** { **15-min** | **30-sec** | **24-hour** } { **optics** | **ether** | **pcs** | **fec** | **otn** | **ocn** | **stm** } { **report** | **threshold** }

Example:

This is a sample in which the performance monitoring parameters of the Optics controller are configured at 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
```

Example:

This is a sample in which the performance monitoring parameters of the Ethernet controller are configured at 15-minute intervals.

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller HundredGigEctrlr 0/3/0/0 pm 15-min pcs report bip enable
RP/0/RP0/CPU0:ios(config)#commit
```

Example:

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

```
RP/0/RP0/CPU0:ios#configure
RP/0/RP0/CPU0:ios(config)#controller coherentDSP 0/0/1/1 pm 30-sec fec threshold post-fec-ber max
OE-15
RP/0/RP0/CPU0:ios(config)#commit
```

Step 3

Use the command **performance-monitor-engine flex-bin interval *duration***, to configure PM with flexible bin interval for a particular duration.

Example:

This is a sample to configure PM with flexible bin interval as 1 second.

```
RP/0/RP0/CPU0:ios#configure
Thu Sep 30 10:38:39.729 UTC
RP/0/RP0/CPU0:ios(config)#performance-monitor-engine flex-bin interval 1
RP/0/RP0/CPU0:ios(config)#commit
Thu Sep 30 10:38:57.987 UTC
RP/0/RP0/CPU0:ios(config)#
```

Upon successful configuration, the specified controllers will begin collecting and retaining PM data according to the set parameters. You will be able to view historical and current performance metrics for troubleshooting and ongoing system health monitoring.

What to do next

Verify PM configuration and review collected PM data using show commands.

View PM parameters

Use this task to view performance monitoring (PM) parameters for Optics, Ethernet, and Coherent DSP controllers. This allows you to assess the operational status, diagnostics, and statistics of controller components for maintenance and troubleshooting.

Performance monitoring parameters provide insight into the health and performance of controller interfaces, including metrics such as optical power, frequency offset, and signal quality. Viewing these parameters helps network operators verify ongoing performance, detect anomalies, and ensure compliance with operational thresholds. Perform this task regularly to support proactive maintenance and rapid fault resolution.

Procedure

Use the command **show controllers *controllertype R/S/I/P* { pm { current | history } { 30 sec | 15-min | 24-hour } { optics | ether | fec | otn | prbs} *linenumber* }**, to view the performance monitoring parameters for Optics, Ethernet, and Coherent DSP controllers.

Example:

This sample displays the current performance monitoring parameters of the Optics controller at 15-minute intervals. Client optics have four lanes.

View PM parameters

```
RP/0/RP0/CPU0:ios#show controller optics 0/1/0/3 pm current 15-min optics 3
Sat Feb 9 19:33:42.480 UTC
```

Optics in the current interval [19:30:00 - 19:33:42 Sat Feb 9 2019]

Optics current bucket type : Valid

Configured	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	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						
FREQ_OFF[Mhz]	: 0	0	0	0	NA	NO	0
NA	NO						

This sample displays the current performance monitoring parameters of the Optics controller 15-minute intervals. Trunk optics have one lane.

```
RP/0/RP0/CPU0:ios#show controller optics 0/2/0/1 pm current 15-min optics 1
```

```
Sat Feb 9 11:19:15.234 UTC
```

Optics in the current interval [11:15:00 - 11:19:15 Sat Feb 9 2019]

Optics current bucket type : Valid

Configured	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	100.0
NA	NO						
OPT[dBm]	: -1.51	-1.49	-1.48	-30.00	NA	NO	63.32
NA	NO						
OPR[dBm]	: -9.11	-9.07	-9.03	-30.00	NA	NO	63.32
NA	NO						
CD[ps/nm]	: 13	15	18	-180000	NA	NO	180000
NA	NO						
DGD[ps]	: 2.00	2.33	3.00	0.01	NA	NO	21474836.46
NA	NO						
SOPMD[ps^2]	: 5.00	33.02	79.00	0.01	NA	NO	21474836.46
NA	NO						
OSNR[dB]	: 31.50	31.97	32.50	0.01	NA	NO	21474836.46
NA	NO						
PDL[dB]	: 0.20	0.34	0.50	0.01	NA	NO	21474836.46
NA	NO						
PCR[rad/s]	: 0.00	19.92	93.00	0.01	NA	NO	21474836.46
NA	NO						
RX_SIG[dBm]	: -9.05	-9.02	-8.99	-30.00	NA	NO	63.32
NA	NO						

```
FREQ_OFF[Mhz]: -302      -178      -74      -1500      NA      NO      1500
NA              NO
```

Performance monitoring parameter outputs for Ethernet, FEC, optics, and Fibre Channel controllers

This reference presents sample outputs from performance monitoring commands for multiple controller types and time intervals. It helps you understand what data is collected and how counters are displayed in operational environments.

This sample displays the current performance monitoring parameters of the Ethernet controller 15-minute intervals.

```
RP/0/RP0/CPU0:ios#show controller HundredGigECtrlr 0/1/0/2 pm current 15-min ether
Fri Aug 30 00:37:53.527 UTC
```

```
ETHER in the current interval [00:30:00 - 00:37:53 Fri Aug 30 2019]
```

```
ETHER current bucket type : Valid
RX-UTIL[%]                : 100.00      Threshold : 0.00      TCA(enable) : NO
TX-UTIL[%]                : 10.00      Threshold : 0.00      TCA(enable) : NO
RX-PKT                    : 3852414442  Threshold : 0        TCA(enable) : NO
STAT-PKT                  : 0          Threshold : 0        TCA(enable) : NO
OCTET-STAT                : 5847965122956 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                    : 7053588067  Threshold : 0        TCA(enable) : NO
OUT-OCTET                 : 451429636288 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             : 5847965122956 Threshold : 0        TCA(enable) : NO
IN_GOOD_PKTS              : 3852414442  Threshold : 0        TCA(enable) : NO
IN_DROP_OTHER             : 0          Threshold : 0        TCA(enable) : NO
OUT_GOOD_BYTES            : 451429636288 Threshold : 0        TCA(enable) : NO
OUT_GOOD_PKTS             : 7053588067  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  : 3852414442  Threshold : 0        TCA(enable) : NO
OUT_PKT_64_OCTET          : 7053588067  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

```



Note Performance monitoring statistics are not supported for IN-UCAST and OUT-UCAST counters for Ethernet clients.



Note If you set the LC mode on the OTN-XP card to 4x100G-MXP-400G-TXP-LC, the performance monitoring parameters for the 400GE controllers (fourHundredGigEctrlr) are unsupported in the card.

This sample displays the current FEC performance monitoring parameters of the Coherent DSP controller at 15-minute intervals.

```
RP/0/RP0/CPU0:ios#show controller coherentDSP 0/2/0/1 pm current 15-min fec
```

```
Sat Feb 9 11:23:42.196 UTC
```

```
g709 FEC in the current interval [11:15:00 - 11:23:42 Sat Feb 9 2019]
```

```
FEC current bucket type : Valid
```

```

EC-BITS      : 291612035786          Threshold : 903330          TCA(enable) :
YES
UC-WORDS     : 0                    Threshold : 5              TCA(enable) :
YES

```

	MIN	AVG	MAX	Threshold	TCA	Threshold	TCA
				(min)	(enable)	(max)	(enable)
PreFEC BER :	7.1E-03	7.2E-03	8.1E-03	0E-15	NO	0E-15	NO
PostFEC BER :	0E-15	0E-15	0E-15	0E-15	NO	0E-15	NO

This sample displays the current PRBS performance monitoring parameters of the Coherent DSP controller 15-minute intervals.

```
RP/0/RP0/CPU0:ios#show controllers coherentDSP 0/0/0/1 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
```

This sample displays the current PCS performance monitoring parameters of the Coherent DSP controller 30-second intervals.

```
RP/0/RP0/CPU0:ios#show controllers hundredGigEctrlr 0/0/0/2 pm current 30-sec pcs
```

```
Tue Nov 19 09:17:26.684 UTC
```

Ethernet PCS in the current interval [09:17:00 - 09:17:26 Tue Nov 19 2019]

```
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

```

```

Last clearing of "show controllers ETHERNET " counters never
RP/0/RP0/CPU0:BH1_P2A4#

```

This sample displays the history PCS performance monitoring parameters of the 100GE controller at 30-second intervals.

```

RP/0/RP0/CPU0:ios#show controllers hundredGigEctrlr 0/0/0/2 pm history 30-sec pcs 1
Tue Nov 19 09:27:49.169 UTC

```

```

Ethernet PCS in the current interval [09:27:00 - 09:27:30 Tue Nov 19 2019]

```

```

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[16] : 0
BIP[17] : 0
BIP[18] : 0
BIP[19] : 0
FRM-ERR[00] : 0
FRM-ERR[01] : 0
FRM-ERR[02] : 0
..... 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[18] : 0
BAD-SH[19] : 0
ES : 0
SES : 0
UAS : 0
ES-FE : 0
SES-FE : 0
UAS-FE : 0

```

```

Last clearing of "show controllers ETHERNET " counters never
RP/0/RP0/CPU0:BH1_P2A4#

```

This sample displays the current performance monitoring parameters of the optics controller at 10-second intervals as flexi-bin.

```

RP/0/RP0/CPU0:ios#show controllers optics 0/0/0/0 pm current flex-bin optics 1
Thu May 21 07:43:38.964 UTC

```

```

Optics in the current interval [07:43:30 - 07:43:38 Thu May 21 2020]

```

Flexible bin interval size: 10 seconds

Optics current bucket type : Valid

	MIN Configured	AVG TCA	MAX	Operational Threshold(min)	Configured Threshold(min)	TCA (min)	Operational Threshold(max)
LBC[%]	: 0.0	0.0	0.0	0.0	NA	NO	0.0
	NA	NO					
OPT[dBm]	: -0.13	-0.10	-0.06	0.00	NA	NO	0.00
	NA	NO					
OPR[dBm]	: -3.01	-2.96	-2.92	0.00	NA	NO	0.00
	NA	NO					
CD[ps/nm]	: -3	-2	-1	0	NA	NO	0
	NA	NO					
DGD[ps]	: 1.00	1.67	2.00	0.00	NA	NO	0.00
	NA	NO					
SOPMD[ps^2]	: 17.00	37.00	81.00	0.00	NA	NO	0.00
	NA	NO					
OSNR[dB]	: 37.60	37.60	37.60	0.00	NA	NO	0.00
	NA	NO					
PDL[dB]	: 0.60	0.66	0.70	0.00	NA	NO	0.00
	NA	NO					
PCR[rad/s]	: 0.00	29.11	80.00	0.00	NA	NO	0.00
	NA	NO					
RX_SIG[dBm]	: -3.49	-3.41	-3.36	0.00	NA	NO	0.00
	NA	NO					
FREQ_OFF[Mhz]	: 191	241	301	0	NA	NO	0
	NA	NO					
SNR[dB]	: 14.50	14.62	14.70	0.00	NA	NO	0.00
	NA	NO					
SNR-AX[dB]	: 17.10	17.19	17.30	0.00	NA	NO	0.00
	NA	NO					
SNR-AY[dB]	: 11.90	12.06	12.10	0.00	NA	NO	0.00
	NA	NO					
SNR-BX[dB]	: 0.00	0.00	0.00	0.00	NA	NO	0.00
	NA	NO					
SNR-BY[dB]	: 0.00	0.00	0.00	0.00	NA	NO	0.00
	NA	NO					
SOP-S1	: 0.50	0.55	0.59	0.00	NA	NO	0.00
	NA	NO					
SOP-S2	: -0.59	-0.52	-0.48	0.00	NA	NO	0.00
	NA	NO					
SOP-S3	: -0.67	-0.64	-0.60	0.00	NA	NO	0.00
	NA	NO					

Last clearing of "show controllers OPTICS" counters never

This sample displays the history performance monitoring parameters of the optics controller at 10-second intervals as flexi-bin.

RP/0/RP0/CPU0:ios#show controllers optics 0/0/0/0 pm history flex-bin optics 1 bucket 1
Thu May 21 07:45:44.358 UTC

Optics in interval 1 [07:45:30 - 07:45:40 Thu May 21 2020]

Flexible bin interval size: 10 seconds

Optics history bucket type : Valid

	MIN	AVG	MAX
LBC[%]	: 0.0	0.0	0.0
OPT[dBm]	: -0.12	-0.10	-0.04
OPR[dBm]	: -3.01	-2.97	-2.91
CD[ps/nm]	: -5	-4	-3

```

DGD[ps ] : 1.00      1.50      2.00
SOPMD[ps^2]: 28.00    43.10    66.00
OSNR[dB] : 37.60    37.60    37.60
PDL[dB]  : 0.60     0.65     0.70
PCR[rad/s] : 0.00     25.70    75.00
RX_SIG[dBm] : -3.49    -3.44    -3.37
FREQ_OFF[Mhz]: 235      272      330
SNR[dB]   : 14.60    14.64    14.80
SNR-AX[dB]: 17.20    17.25    17.30
SNR-AY[dB]: 11.90    12.02    12.20
SNR-BX[dB]: 0.00     0.00     0.00
SNR-BY[dB]: 0.00     0.00     0.00
SOP-S1    : 0.50     0.53     0.57
SOP-S2    : -0.58    -0.53    -0.49
SOP-S3    : -0.69    -0.65    -0.61

```

This sample displays the current FEC performance monitoring parameters of the coherentDSP controller as flexi-bin.

```

RP/0/0/CPU0:ios#show controllers coherentDSP 0/2/0/0 pm current flex-bin fec
Thu Apr 9 11:46:55.659 IST

```

g709 FEC in the current interval [11:46:50 - 11:46:55 Thu Apr 9 2020]

Flexible bin interval size: 10 seconds

FEC current bucket type : Valid

```

EC-BITS : 327          Threshold : 0          TCA(enable) :
NO
UC-WORDS : 327          Threshold : 0          TCA(enable) :
NO

```

TCA	MIN	AVG	MAX	Threshold	TCA	Threshold
(enable)				(min)	(enable)	(max)
PreFEC BER	5.20E-14	5.40E-14	5.70E-14	0E-15	NO	
0E-15 NO						
PostFEC BER	5.20E-14	5.40E-14	5.70E-14	0E-15	NO	
0E-15 NO						
Q[dB]	0.52	0.54	0.57	0.00	NO	0.00
NO						
Q_Margin[dB]	2.52	1.54	4.57	0.00	NO	0.00
NO						
Q_Margin Instantaneous [dB]	2.52	1.54	4.57	0.00	NO	0.00
NO						

Last clearing of "show controllers OTU" counters never

This sample displays the current OTN path monitor performance monitoring parameters of the ODU4 controller 1-second intervals.

```

P/0/RP0/CPU0:ios#show controllers odu4 0/2/0/13/8 pm current flex-bin otn pathmonitor
Wed Sep 22 12:47:09.497 UTC

```

g709 OTN in the current interval [12:47:08 - 12:47:08 Wed Sep 22 2021]

Flexible bin interval size: 1 seconds

OTN current bucket type : Valid

```

ES-NE : 0          Threshold : 0          TCA(enable) : NO
ESR-NE : 0.00000  Threshold : 0.00000  TCA(enable) : NO
SES-NE : 0          Threshold : 0          TCA(enable) : NO
SESR-NE : 0.00000  Threshold : 0.00000  TCA(enable) : NO

```

```

UAS-NE : 0          Threshold : 0          TCA(enable) : NO
BBE-NE : 0          Threshold : 0          TCA(enable) : NO
BBER-NE : 0.00000  Threshold : 0.00000  TCA(enable) : NO
FC-NE   : 0          Threshold : 0          TCA(enable) : NO

ES-FE   : 0          Threshold : 0          TCA(enable) : NO
ESR-FE  : 0.00000   Threshold : 0.00000   TCA(enable) : NO
SES-FE  : 0          Threshold : 0          TCA(enable) : NO
SESR-FE : 0.00000   Threshold : 0.00000   TCA(enable) : NO
UAS-FE  : 0          Threshold : 0          TCA(enable) : NO
BBE-FE  : 0          Threshold : 0          TCA(enable) : NO
BBER-FE : 0.00000   Threshold : 0.00000   TCA(enable) : NO
FC-FE   : 0          Threshold : 0          TCA(enable) : NO

```

Last clearing of "show controllers ODU" counters never
RP/0/RP0/CPU0:ios#

This sample displays the current performance monitoring parameters of the 16G FC controller for 24 hours.

```
RP/0/RP0/CPU0:ios#show controllers sixteenGigFibreChanCtrlr 0/2/0/1/1 pm current 24-hour
fc
Thu Jan 6 19:13:07.222 UTC
```

FC in the current interval [00:00:00 - 19:13:07 Thu Jan 6 2022]

```
FC current bucket type : Valid
IFIN-OCTETS : 8691662359380 Threshold : 0 TCA(enable) : NO
RX-PKT      : 4061524467 Threshold : 0 TCA(enable) : NO
IFIN-ERRORS : 0 Threshold : 0 TCA(enable) : NO
RX-BAD-FCS  : 0 Threshold : 0 TCA(enable) : NO
IFOUT-OCTETS : 8691662359380 Threshold : 0 TCA(enable) : NO
TX-PKT      : 4061524467 Threshold : 0 TCA(enable) : NO
TX-BAD-FCS  : 0 Threshold : 0 TCA(enable) : NO
RX-FRAMES-TOO-LONG : 0 Threshold : 0 TCA(enable) : NO
RX-FRAMES-TRUNC : 0 Threshold : 0 TCA(enable) : NO
TX-FRAMES-TOO-LONG : 0 Threshold : 0 TCA(enable) : NO
TX-FRAMES-TRUNC : 0 Threshold : 0 TCA(enable) : NO

```

Last clearing of "show controllers FC" counters never
RP/0/RP0/CPU0:ios#

This sample displays the PM statistics for OTN path monitor with flexible bin interval as 1 second.

```
P/0/RP0/CPU0:ios#show controllers odu4 0/2/0/13/8 pm current flex-bin otn pathmonitor
Wed Sep 22 12:47:09.497 UTC
```

g709 OTN in the current interval [12:47:08 - 12:47:08 Wed Sep 22 2021]

Flexible bin interval size: 1 seconds

```
OTN current bucket type : Valid
ES-NE : 0          Threshold : 0          TCA(enable) : NO
ESR-NE : 0.00000   Threshold : 0.00000   TCA(enable) : NO
SES-NE : 0          Threshold : 0          TCA(enable) : NO
SESR-NE : 0.00000  Threshold : 0.00000   TCA(enable) : NO
UAS-NE : 0          Threshold : 0          TCA(enable) : NO
BBE-NE : 0          Threshold : 0          TCA(enable) : NO
BBER-NE : 0.00000  Threshold : 0.00000   TCA(enable) : NO
FC-NE   : 0          Threshold : 0          TCA(enable) : NO

ES-FE   : 0          Threshold : 0          TCA(enable) : NO
ESR-FE  : 0.00000   Threshold : 0.00000   TCA(enable) : NO
SES-FE  : 0          Threshold : 0          TCA(enable) : NO

```

```

SESR-FE : 0.00000   Threshold : 0.00000   TCA(enable) : NO
UAS-FE  : 0          Threshold : 0           TCA(enable) : NO
BBE-FE  : 0          Threshold : 0           TCA(enable) : NO
BBER-FE : 0.00000   Threshold : 0.00000   TCA(enable) : NO
FC-FE   : 0          Threshold : 0           TCA(enable) : NO

```

Last clearing of "show controllers ODU" counters never

Viewing PM Statistics

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

```

RP/0/RP0/CPU0:ios#show controllers HundredGigEctrlr 0/0/0/2 stats
Fri Aug 30 13:10:33.123 IST
Statistics for interface HundredGigEctrlr0/0/0/2 (cached values):

```

Ingress:

```

Input total bytes           = 1702197139760640
Input good bytes            = 1702197139760640

Input total packets         = 13298415154380
Input 802.1Q frames         = 0
Input pause frames         = 0
Input pkts 64 bytes         = 0
Input pkts 65-127 bytes     = 0
Input pkts 128-255 bytes    = 13298415154380
Input pkts 256-511 bytes    = 0
Input pkts 512-1023 bytes   = 0
Input pkts 1024-1518 bytes  = 0
Input pkts 1519-Max bytes   = 0

Input good pkts             = 13298415154380
Input unicast pkts         = 0
Input multicast pkts        = 0
Input broadcast pkts        = 0

Input drop overrun          = 0
Input drop abort            = 0
Input drop invalid VLAN     = 0
Input drop invalid DMAC     = 0
Input drop invalid encap    = 0
Input drop other            = 0

Input error giant           = 0
Input error runt            = 0
Input error jabbers         = 0
Input error fragments     = 0
Input error CRC              = 0
Input error collisions       = 0
Input error symbol          = 0
Input error other           = 0

Input MIB giant             = 0
Input MIB jabber            = 0
Input MIB CRC                = 0

```

Egress:

```

Output total bytes          = 1702197139760640
Output good bytes           = 1702197139760640

Output total packets        = 13298415154380
Output 802.1Q frames        = 0
Output pause frames         = 0

```

```

Output pkts 64 bytes          = 0
Output pkts 65-127 bytes     = 0
Output pkts 128-255 bytes    = 13298415154380
Output pkts 256-511 bytes    = 0
Output pkts 512-1023 bytes   = 0
Output pkts 1024-1518 bytes  = 0
Output pkts 1519-Max bytes   = 0

Output good pkts             = 13298415154380
Output unicast pkts         = 0
Output multicast pkts        = 0
Output broadcast pkts        = 0

Output drop underrun         = 0
Output drop abort            = 0
Output drop other            = 0

Output error other           = 0

```

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



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

Clear PM parameters

Use this task to restore PM parameters on Ethernet or Coherent DSP controllers, ensuring that performance metrics are reset for accurate monitoring.

Clearing PM parameters is necessary when you want to reset the accumulated performance statistics for your controllers. This allows you to start fresh measurements and can be useful for troubleshooting, maintenance, or validating recent changes.

Procedure

Use the command **clear controller *controllertype* R/S/I/P pm**, to clear the performance monitoring parameters for Ethernet and Coherent DSP controllers.

Example:

This sample clears the PM parameters on the Coherent DSP controller.

```
RP/0/RP0/CPU0:ios#show controller CD 0/0/0/0 pm current 15-min fec
Mon Jun 10 11:43:39.981 UTC
```

```
g709 FEC in the current interval [11:30:00 - 11:43:40 Mon Jun 10 2019]
```

```

FEC current bucket type : Invalid
EC-BITS   : 308360273           Threshold : 903330           TCA(enable) : YES
UC-WORDS  : 131108352           Threshold : 5               TCA(enable)  : YES

          MIN      AVG      MAX      Threshold  TCA      Threshold  TCA
                   (min)    (enable)  (max)    (enable)

```

Clear PM parameters

```

PreFEC BER : 3.44E-02  3.45E-02  3.45E-02  0E-15      NO  0E-15      NO
PostFEC BER : 0E-15   0E-15   0E-15   0E-15      NO  0E-15      NO
Q           : 0.51    0.51    0.51    0.00      NO  0.00      NO
Q_Margin   : 0.00    0.00    0.00    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 CD 0/0/0/0 pm current 15-min fec
Mon Jun 10 11:44:38.804 UTC

```

g709 FEC in the current interval [11:30:00 - 11:44:38 Mon Jun 10 2019]

```

FEC current bucket type : Invalid
  EC-BITS   : 0                Threshold : 903330          TCA(enable) : YES
  UC-WORDS  : 0                Threshold : 5                 TCA(enable) : YES

```

	MIN	AVG	MAX	Threshold (min)	TCA (enable)	Threshold (max)	TCA (enable)
PreFEC BER	3.44E-02	3.44E-02	3.45E-02	0E-15	NO	0E-15	NO
PostFEC BER	0E-15	0E-15	0E-15	0E-15	NO	0E-15	NO
Q	0.51	0.51	0.51	0.00	NO	0.00	NO
Q_Margin	0.00	0.00	0.00	0.00	NO	0.00	NO

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

This sample clears the PM parameters on the Ethernet controller.

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