Monitor Performance

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 flex-bin, 30-second, 15-minute, or 24-hour intervals. These parameters simplify troubleshooting operations and enhance data that can be collected directly from the equipment.

Monitor Performance

You can set and retrieve PM counters for the OTS, OTS-OCH, OSC, OCH, and OMS controllers for various intervals.

PM Parameters for Controllers table lists the PM parameters, their descriptions, and precision levels.

Table 1: PM Parameters for Controllers

PM Parameter (Unit of Measure)	Description	Resolution
SLR(C+L) [dB]	Rx Span Loss	1/100
SLT(C+L) [dB]	Tx Span Loss	1/100
SLR(S) [dB]	Rx Signal Span Loss	1/100
SLT(S) [dB]	Tx Signal Span Loss	1/100
OPT [dBM]	Total Tx(C+OSC) power	1/100
OPR [dBM]	Total Rx(C+OSC) power	1/100
OPT(C+L) [dBM]	Total Tx(C+L+OSC) power	1/100
OPR(C+L) [dBM]	Total Rx(C+L+OSC) power	1/100
OPR(S) [dBM]	C Band Received Signal Power	1/100
OPT(S) [dBM]	C Band Transmitted Signal Power	1/100
OPBR [dBM]	Back Reflection Power	1/100

EAGN [dB]	Egress Amplifier Gain	1/100
EATL [dB]	Egress Amplifier Tilt	1/100
IAGN [dB]	Ingress Amplifier Gain	1/100
IATL [dB]	Ingress Amplifier Tilt	1/100

The PM Thresholds for OLT OTS Controller tables list the maximum and minimum thresholds that can be set for the PM parameters for OLT nodes.

Table 2: PM Thresholds for OLT OTS Controller (0/0/0/0)

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–2000	4000
OPR	–3000	1800
OPT(C+L)	–2000	6085
OPR(C+L)	–3000	3600
OPR(S)	–3000	1800
OPT(S)	–500	2800
OPBR	–3000	–1400
EAGN	1390	3100
EATL	–500	500
IAGN	1030	3800
IATL	–500	500

Table 3: PM Thresholds for OLT OTS Controller (0/0/0/2 and 0/0/0/3)

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–3000	1500
OPR	–2500	1800
IAGN	1300	1900
IATL	–500	500

Table 4: PM Thresholds for OLT OTS Controller (0/0/0/4 to 0/0/0/33)

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–3000	1500

OPR	–1500	1000

Table 5: PM Thresholds for OLT OTS-OCH Controller

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–3000	1500
OPR	–3000	1500

Table 6: PM Thresholds for OLT OSC Controller (0/0/0/0)

Parameter	Threshold Min	Threshold Max
OPT	–2000	1200
OPR	–3000	0

PM Thresholds for OCH Controllers table lists the maximum and minimum thresholds that are set for the PM parameters for OCH controllers.

Table 7: PM Thresholds for OCH Controllers

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–30	15
OPR	–30	15

PM Thresholds for OMS Controllers table lists the maximum and minimum thresholds that are set for the PM parameters for OMS controllers.

Table 8: PM Thresholds for OMS Controllers

PM Parameter	Minimum Threshold	Maximum Threshold
OPT	–30	15
OPR	–30	15

Configure and View PM Parameters

You can configure the performance monitoring parameters for the controllers. To configure PM parameters, use the following commands in the configuration mode:

controller *controllertype R/S/I/P* { **pm** { **15-min** | **24-hour** | **30-sec** | **flex-bin** } { **optics** | **ots** } { **report** | **threshold** } { **opr** | **opt** | **eagn** | **eatl** | **iagn** | **iatl** | **slr-cl** | **slt-cl** | **opbr** | **opr** | **opr-cl** | **opr-s** | **opt** | **opt-cl** | **opt-s** } { **max-tca** | **min-tca** } {**enable** | *value* }

Examples

The following example enables the maximum and minimum Threshold Crossing Alert (TCA) reporting on the OTS controller for a 15 minute interval. The sample also configures the maximum and minimum Rx span loss threshold to 36db and 33db respectively. These values are compared against the current maximum span loss value to determine if a TCA should be generated.

```
RP/O/RPO/CPUO:ios#config
RP/O/RPO/CPUO:ios(config)#controller ots 0/0/0/0 pm 15-min ots report slr-cl max-tca enable
RP/0/RPO/CPUO:ios(config)#controller ots 0/0/0/0 pm 15-min ots threshold slr-cl max 3600
RP/O/RPO/CPUO:ios(config)#controller ots 0/0/0/0 pm 15-min ots report slr-cl min-tca enable
RP/0/RPO/CPUO:ios(config)#controller ots 0/0/0/0 pm 15-min ots threshold slr-cl min 3300
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

The following example shows the TOT-SPAN-LOSS-TX-CL-MAX alert is triggered when the current TX span loss value exceeds the maximum TX span loss threshold:

```
RP/0/RP0/CPU0:P1D_DT_04#show alarms brief system conditions | include SPAN
Thu Oct  5 04:49:21.462 UTC
0/0             NotAlarmed   Controller       10/05/2023 04:49:00 UTC    Ots0/0/0/0 -
Threshold Crossing Alert For TOT-SPAN-LOSS-TX-CL-MAX In 30 Second Bucket
```

The following example sets the reporting status to maximum TCA for the eagn parameter of the OTS controller for a 15-minute interval.

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#controller ots 0/0/0/0 pm 15-min ots report eagn max-tca enable
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

The following example configures the maximum threshold for the eagn parameter of the OTS controller to 20 dB.

Note The OTS controller commands accept PM parameter values in two decimal places. In this example, the *eagn* parameter is entered as *2000* to configure the *eagn* parameter to *20 dB*.

```
RP/0/RP0/CPU0:ios#config
RP/0/RP0/CPU0:ios(config)#controller ots 0/0/0/0 pm 15-min ots threshold eagn max 2000
RP/0/RP0/CPU0:ios(config)#commit
RP/0/RP0/CPU0:ios(config)#end
```

To view the current PM parameters on an OTS controller for a 15-minute interval, use the following command:

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

The following output shows the current PM parameters on an OTS controller for a 15-minute interval and highlights the *maximum threshold* set for the *eagn* parameter that is configured for *20 dB*.

```
Tue May 17 06:37:00.529 UTC

Optics in the current interval [06:30:00 - 06:37:00 Tue May 17 2022]

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]     : 20.00     20.00     20.00    -20.00     NA           NO   40.00         NA
```

```
          NO
OPR[dBm]      : 20.00     20.00     20.00    -30.00     NA           NO   18.00          NA
          NO
OPT(C+L)[dBm]: 20.00     20.00     20.00    -20.00     NA           NO   60.85          NA
          NO
OPR(C+L)[dBm]: -10.00    -10.00    -10.00   -30.00     NA           NO   36.00          NA
          NO
OPT(S)[dBm]   : 20.00     20.00     20.00    -5.00      NA           NO   28.00          NA
          NO
OPR(S)[dBm]   : 20.00     20.00     20.00    -30.00     NA           NO   18.00          NA
          NO
OPBR[dBm]     : -30.00    -30.00    -30.00   -30.00     NA           NO   -14.09         NA
          NO
SLR(C+L)[dB]      : 0.00      0.00      0.00     0.00             NA             NO   42.00
           NA               NO
SLT(C+L)[dB]      : 0.00      0.00      0.00     0.00             NA             NO   42.00
           NA               NO
SLR(S)[dB]      : 0.00      0.00      0.00     0.00             NA             NO   42.00
           NA               NO
SLT(S)[dB]      : 0.00      0.00      0.00     0.00             NA             NO   42.00
           NA               NO
EAGN[dB]      : 30.00     30.00     30.00    16.00      NA           NO   20.00          20.00
        YES
EATL[dB]      : -4.80     -4.80     -4.80    -5.00      NA           NO   5.00           NA
          NO
IAGN[dB]      : 25.00     25.00     25.00    12.00      NA           NO   25.00          NA
          NO
IATL[dB]      : -2.40     -2.40     -2.40    -5.00      NA           NO   5.00           NA
          NO

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

To view the historical PM parameters on an OTS controller for a 15-minute interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers ots 0/0/0/0 pm history 15-min optics  1 bucket 1
```

The following output shows the historical PM parameters on an OTS controller for a 15-minute interval.

```
Tue Sep  3 12:26:53.739 IST

Optics in interval 1 [12:00:00 - 12:15:00 Tue Sep 3 2024]

Optics history bucket type : Valid
             MIN       AVG       MAX
OPT[dBm]    : 15.02     15.08     15.12
OPR[dBm]    : -1.94     -1.94     -1.94
OPT(C+L)[dBm]    : 15.00     15.06     15.10
OPR(C+L)[dBm]    : -1.90     -1.90     -1.90
OPT(S)[dBm]    : 14.90     14.96     15.00
OPR(S)[dBm]    : -2.00     -2.00     -2.00
OPBR[dBm]    : -25.70    -25.63    -25.50
OPBRR[dB]    : -40.59    -40.59    -40.50
EAGN[dB]    : 17.00     17.00     17.00
EATL[dB]    : 0.00      0.00      0.00
SLR(C+L)[dB]    : 21.90     21.92     21.98
SLT(C+L)[dB]    : 9.68      9.71      9.75
SLR(S)[dB]    : 21.90     21.92     21.98
SLT(S)[dB]    : 9.68      9.71      9.75
```

To view the current PM parameters on an OTS-OCH controller for a 15-minute interval, use the following command:

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

The following output shows the current PM parameters on an OTS-OCH controller for a 15-minute interval.

```
Tue May 17 10:27:20.387 UTC

Optics in the current interval [10:15:00 - 10:27:20 Tue May 17 2022]

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] : 1.20 1.30   1.30     -30.00            NA            NO         15.00
NA      NO
OPR[dBm] :-12.31-12.25-12.20    -30.00            NA            NO         15.00
NA      NO
Last clearing of "show controllers OPTICS" counters never
```

To view the current PM parameters on an OSC controller for a 15-minute interval, use the following command:

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

The following output shows the current PM parameters on an OSC controller for a 15-minute interval.

```
Tue May 17 08:24:32.642 UTC

Optics in the current interval [08:15:00 - 08:24:32 Tue May 17 2022]

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]     : -10.00    -10.00    -10.00   -20.00            NA           NO   12.00
       NA           NO
OPR[dBm]     : -30.00    -30.00    -30.00   -30.00            NA           NO   0.00
       NA           NO

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

To view the current PM parameters for an OCH controller for a 30-second interval, use the following command:

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

The following output shows the current PM parameters for an OCH controller for a 30-second interval.

```
Tue May 10 11:28:29.896 UTC

Optics in the current interval [11:28:00 - 11:28:29 Tue May 10 2022]

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]     : -50.00    -50.00    -50.00   -30.00            NA              NO   15.00
          NA              NO
OPR[dBm]     : -50.00    -50.00    -50.00   -30.00            NA              NO   15.00
          NA              NO

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

To view the current PM parameters for an OTS controller for a 30-second interval, use the following command:

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

The following output shows the current PM parameters on an OTS controller for a 30-second interval.

```
Optics in the current interval [19:39:30 - 19:39:40 Fri Jun 14 2024]

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]      : 22.72     22.77     22.82    -28.00            NA              NO   40.00
          NA               NO
OPR[dBm]      : -19.35    -19.35    -19.35   -30.00            NA              NO   20.00
          NA               NO
OPT(C+L)[dBm] : 22.70     22.75     22.80    -28.00             NA              NO   80.00
          NA               NO
OPR(C+L)[dBm] : -19.40    -19.40    -19.40   -30.00             NA              NO   40.00
          NA               NO
OPT(S)[dBm]   : 22.70     22.75     22.80    -28.00             NA              NO   28.00
          NA               NO
OPR(S)[dBm]   : -34.20    -34.13    -34.09   -30.00             NA              NO   20.00
          NA               NO
SLR(C+L)[dB]     : 0.00      0.00      0.00     0.00              NA              NO   42.00
           NA               NO
SLT(C+L)[dB]     : 0.00      0.00      0.00     0.00              NA              NO   42.00
           NA               NO
SLR(S)[dB]     : 0.00      0.00      0.00     0.00               NA              NO   42.00
           NA               NO
SLT(S)[dB]     : 0.00      0.00      0.00     0.00               NA              NO   42.00
           NA               NO
OPBR[dBm]      : 3.10      3.15      3.20     -30.00             NA              NO   -14.00
          NA               NO
OPBRR[dB]      : -19.60    -19.60    -19.60   -50.00             NA              NO   0.00
          NA               NO
EAGN[dB]       : 23.90     23.94     24.00    8.00               NA              NO   36.00
          NA               NO
EATL[dB]       : 4.00      4.05      4.10     -5.00              NA              NO   5.00
          NA               NO
```

To view the historical PM parameters on an OCH controller for a 30-second interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers och 0/1/0/0 pm history 30-sec optics 1 bucket 1
```

The following output shows the historical PM parameters on an OCH controller for a 30-second interval.

```
Mon Jul 25 05:35:52.176 UTC

Optics in interval 1 [05:35:00 - 05:35:30 Mon Jul 25 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
OPT[dBm]    : -50.00    -50.00    -50.00
OPR[dBm]    : -50.00    -50.00    -50.00

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

To view the current PM parameters for an OCH controller for a 15-minute interval, use the following command:

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

The following output shows the current PM parameters for an OCH controller for a 15-minute interval.

```
Tue May 10 11:28:50.952 UTC

Optics in the current interval [11:15:00 - 11:28:50 Tue May 10 2022]

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]     : -50.00    -50.00    -50.00   -30.00            NA              NO   15.00
          NA              NO
OPR[dBm]     : -50.00    -50.00    -50.00   -30.00            NA              NO   15.00
          NA              NO

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

To view the historical PM parameters for an OCH controller for a 15-minute interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers och 0/1/0/0 pm history 15-min optics 1 bucket 1
```

The following output shoes the historical PM parameters for an OCH controller for a 15-minute interval.

```
Mon Jul 25 05:36:12.167 UTC

Optics in interval 1 [05:15:00 - 05:30:00 Mon Jul 25 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
OPT[dBm]   : -50.00    -50.00    -50.00
OPR[dBm]   : -50.00    -50.00    -50.00

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

To view the current PM parameters on an OCH controller for a 24-hour interval, use the following command:

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

The following output shoes the current PM parameters on an OCH controller for a 24-hour interval.

```
Tue May 10 11:29:09.270 UTC

Optics in the current interval [00:00:00 - 11:29:09 Tue May 10 2022]

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

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

To view the historical PM parameters on an OCH controller for a 24-hour interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers och 0/1/0/0 pm history 24-hour optics 1
```

he following output shows the historical PM parameters on an OCH controller for a 24-hour interval.

```
Mon Jul 25 05:36:35.165 UTC

Optics in interval 1 [00:00:00 - 24:00:00 Sun Jul 24 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
OPT[dBm]   : -50.00    -50.00    -50.00
OPR[dBm]   : -50.00    -50.00    -50.00

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

To view the current PM parameters for an OMS controller for a 30-second interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8 pm current 30-sec optics 1
```

The following output shows the current PM parameters for an OMS controller for a 30-second interval.

```
Mon Jul 25 07:24:38.319 UTC

Optics in the current interval [07:24:30 - 07:24:38 Mon Jul 25 2022]

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] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO
OPR[dBm] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO

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

To view the historical PM parameters on an OMS controller for a 30-second interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8  pm history 30-sec optics 1 bucket 1
```

The following shows the historical PM parameters on an OMS controller for a 30-second interval.

```
Mon Jul 25 07:13:51.228 UTC

Optics in interval 1 [07:13:00 - 07:13:30 Mon Jul 25 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
OPT[dBm]    : -50.00    -50.00    -50.00
OPR[dBm]    : -50.00    -50.00    -50.00

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

To view the current PM parameters for an OMS controller for a 15-minute interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8 pm current 15-min optics 1
```

The following output shows the current PM parameters for an OMS controller for a 15-minute interval.

```
Mon Jul 25 07:25:00.183 UTC

Optics in the current interval [07:15:00 - 07:25:00 Mon Jul 25 2022]

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] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO
OPR[dBm] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO

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

To view the historical PM parameters for an OMS controller for a 15-minute interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8  pm history 15-min optics 1 bucket 1
```

The following output shows the historical PM parameters for an OMS controller for a 15-minute interval.

```
Mon Jul 25 07:14:03.090 UTC

Optics in interval 1 [06:45:00 - 07:00:00 Mon Jul 25 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
```

```
OPT[dBm]   : -50.00    -50.00    -50.00
OPR[dBm]   : -50.00    -50.00    -50.00

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

To view the current PM parameters on an OMS controller for a 24-hour interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8 pm current 24-hour optics 1
```

The following output shows the historical PM parameters for an OMS controller for a 15-minute interval.

```
Mon Jul 25 07:26:09.817 UTC

Optics in the current interval [00:00:00 - 07:26:09 Mon Jul 25 2022]

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] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO
OPR[dBm] : -50.00 -50.00 -50.00 -30.00 NA NO 15.00 NA NO

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

To view the historical PM parameters on an OMS controller for a 24-hour interval, use the following command:

```
RP/0/RP0/CPU0:ios#show controllers oms 0/3/0/8 pm history 24-hour optics 1
```

The following output shows the historical PM parameters on an OMS controller for a 24-hour interval.

```
Mon Jul 25 07:18:13.532 UTC

Optics in interval 1 [00:00:00 - 24:00:00 Sun Jul 24 2022]

Optics history bucket type : Valid
              MIN       AVG       MAX
OPT[dBm]   : -50.00    -50.00    -50.00
OPR[dBm]   : -50.00    -50.00    -50.00

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

PM History Persistence

PM history parameters are retained even after a line card cold reload, line card warm reload, rack reload, RP reload, power cycle, or upgrade of the NCS 1020 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. After a software upgrade to a higher version, if new PM parameters are available in the new version, the following error is displayed while fetching PM data.

```
RP/0/RP0/CPU0:ios#show controllers hundredGigECtrlr 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')
```

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 1020 reload or software upgrade happens during the rollover time, one of the following scenarios occurs:

- The 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 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.