Monitor Performance for Cisco ONS 15454 DWDM and Cisco NCS 2000 Series

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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 problems. In the following sections, PM parameters and concepts are defined for transponder, muxponder, and dense wavelength division multiplexing (DWDM) cards in the Cisco ONS 15454 and Cisco NCS including optical amplifier, multiplexer, demultiplexer, optical add/drop multiplexer (OADM), and optical service channel (OSC) cards. It also explains how to enable and view performance monitoring (PM) statistics for the Cisco ONS 15454 and Cisco NCS. PM parameters are used by service providers to gather, store, set thresholds, and report performance data for early detection of problems. For more PM information, details, and definitions, refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* and *Cisco NCS 2000 Series Troubleshooting Guide*.

Note We recommend that you use either single EPNM session in standalone mode or EPNM with two servers in high availability mode. A single PM monitoring session is recommended either through EPNM, TL1, or SNMP.

Note The procedures and tasks described in this chapter for the Cisco ONS 15454 platform is applicable to the Cisco ONS 15454 M2 and Cisco ONS 15454 M6, and Cisco NCS platform is applicable to the Cisco NCS 2002 and Cisco NCS 2006 platforms, unless noted otherwise.

Note Unless otherwise specified, "ONS 15454" refers to both ANSI and ETSI shelf assemblies.

Note In this document, “100G-LC-C card” refers to the 15454-M 100G-LC-C card. “10x10G-LC” refers to the 15454-M-10x10G LC card. “CFP-LC” refers to the 15454-M-CFP-LC card.

Note With references provided to configuration guides, see:

- For software releases 9.3 to 9.8, the Cisco ONS 15454 DWDM Configuration Guide
- For software release 10.0 and later, an appropriate guide from one of these three:
  - Cisco ONS 15454 DWDM Control Card Configuration Guide or Cisco NCS 2000 Series Control Card Configuration Guide
  - Cisco ONS 15454 DWDM Line Card Configuration Guide or Cisco NCS 2000 Series Line Card Configuration Guide
  - Cisco ONS 15454 DWDM Network Configuration Guide or Cisco NCS 2000 Series Network Configuration Guide

Topics include:

Note For additional information regarding PM parameters, refer to ITU G.826, ITU-T G.8021, ITU G.709, Telcordia documents GR-1230-CORE, GR-820-CORE, GR-499-CORE, and GR-253-CORE, and the ANSI T1.231 document entitled *Digital Hierarchy - Layer 1 In-Service Digital Transmission Performance Monitoring*.

Note Cisco ONS 15454 M2 chassis has reached its end-of-life status. For more information, see the Retirement Notification page.

Threshold Performance Monitoring

Thresholds are used to set error levels for each PM parameter. You can set individual PM threshold values from the Cisco Transport Controller (CTC) card view Provisioning tab.

During the accumulation cycle, if the current value of a PM parameter reaches or exceeds its corresponding threshold value, a threshold crossing alert (TCA) is generated by the node and is displayed by CTC. TCAs provide early detection of performance degradation. When a threshold is crossed, the node continues to count the errors during a given accumulation period. If zero is entered as the threshold value, generation of TCAs is disabled but performance monitoring continues.

Note Due to memory limitations and the number of TCAs generated by different platforms, you can manually add or modify the following two properties to the platform property file (CTC.INI for Windows and .ctcrc for UNIX) to fit the need:

- **ctc.15*xxx*.node.tr.lowater**=*yyy* (where *xxx* is platform and *yyy* is the number of the lowater mark. The default lowater mark is 25.)
- **ctc.15*xxx*.node.tr.hiwater**= *yyy* (where *xxx* is platform and *yyy* is the number of the hiwater mark. The default hiwater mark is 50.)

If the number of the incoming TCA is greater than the hiwater mark, the node will keep the latest lowater mark and discard older ones.

Change the threshold if the default value does not satisfy your error monitoring needs. For example, customers with a critical OC192/STM64 transponder installed for 911 calls must guarantee the best quality of service on the line; therefore, they lower all thresholds on the client side so that the slightest error raises a TCA.

Note When LOS, LOS-P, or LOF alarms occur on TXP and MXP trunks, ITU-T G.709/SONET/SDH TCAs are suppressed. For details, see Alarm and TCA Monitoring and Management .

TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Card Performance Monitoring

(Cisco ONS 15454 M2, ONS 15454 M6, NCS 2002, NCS 2006, and NCS 2015)

This section lists the PM parameters and RMONs supported by TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards.

Optics PM Window

The Optics PM window lists the parameters for the TNC, TNCE, and TNCS card. The Optics PM window provides buttons to change the statistical values shown. The **Refresh** button manually refreshes statistics. **Auto-Refresh**h sets a time interval at which automatic refresh occurs. In the Historical PM subtab, the **Clear** button sets the values on the card to zero. All counters on the card are cleared. The **Help** button activates context sensitive help. The Optics PM parameters are shown in the following table.

Table 1: Optics PM Parameters

Optics PM Parameters	Definition
Laser Bias (%)	Laser Bias Current (Laser Bias) is the percentage of laser bias current during the PM time interval.
Laser Bias (Min, %)	Minimum Laser Bias Current (Laser Bias Min) is the minimum percentage of laser bias current during the PM time interval.
Laser Bias (Avg, %)	Average Laser Bias Current (Laser Bias Avg) is the average percentage of laser bias current during the PM time interval.

Laser Bias (Max, %)	Maximum Laser Bias Current (Laser Bias Max) is the maximum percentage of laser bias current during the PM time interval.
Rx Optical Pwr (dBm)	Receive Optical Power (Rx Optical Pwr dBm) is the received optical power during the PM time interval.
Rx Optical Pwr (Min,dBm)	Minimum Receive Optical Power (Rx Optical Pwr Min, dBm) is the minimum received optical power during the PM time interval.
Rx Optical Pwr (Avg,dBm)	Average Receive Optical Power (Rx Optical Pwr Avg, dBm) is the average received optical power during the PM time interval.
Rx Optical Pwr (Max,dBm)	Maximum Receive Optical Power (Rx Optical Pwr Max, dBm) is the maximum received optical power during the PM time interval.
Tx Optical Pwr (dBm)	Transmit Optical Power (Tx Optical Pwr dBm) is the optical power transmitted during the PM time interval.
Tx Optical Pwr (Min,dBm)	Minimum Transmit Optical Power (Tx Optical Pwr Min, dBm) is the minimum optical power transmitted during the PM time interval.
Tx Optical Pwr (Avg,dBm)	Average Transmit Optical Power (Tx Optical Pwr Avg, dBm) is the average optical power transmitted during the PM time interval.
Tx Optical Pwr (Max,dBm)	Maximum Transmit Optical Power (Tx Optical Pwr Max, dBm) is the maximum optical power transmitted during the PM time interval.
PMD (Min,ps)	Minimum Polarization Mode Dispersion (PMD Min,ps) is the minimum polarization mode dispersion during the PM time interval.
PMD (Avg,ps)	Average Polarization Mode Dispersion (PMD Avg,ps) is the average polarization mode dispersion during the PM time interval.

PMD (Max,ps)	Maximum Polarization Mode Dispersion (PMD Max,ps) is the maximum polarization mode dispersion during the PM time interval.
OSNR (Min,dB)	Minimum Optical signal to noise ratio (OSNR Min,dB) is the minimum optical signal to noise ratio during the PM time interval.
OSNR (Avg,dB)	Average Optical signal to noise ratio (OSNR Avg,dB) is the average optical signal to noise ratio during the PM time interval.
OSNR (Max,dB)	Maximum Optical signal to noise ratio (OSNR Max,dB) is the maximum optical signal to noise ratio during the PM time interval.
CD (Min,dB)	Minimum chromatic dispersion (CD Min,dB) is the minimum optical signal to noise ratio during the PM time interval.
CD (Avg,dB)	Average chromatic dispersion (CD Avg,dB) is the average optical signal to noise ratio during the PM time interval.
CD (Max,dB)	Maximum chromatic dispersion (CD Max,dB) is the maximum optical signal to noise ratio during the PM time interval.

Payload PM Window

The Payload PM subtabs are: Ethernet, SONET, Statistics, Utilization, and History. The following buttons function the same on all of the tabs. Not all tabs have all of these buttons.

- The **Refresh** button manually refreshes statistics.
- The **Auto-Refresh** button sets a time interval at which automatic refresh occurs.
- The **Baseline** button resets the displayed statistics values to zero.
- (Statistics window only) The **Clear** button allows you to set the values to zero for displayed statistics, all statistics for a port, and all statistics for all optical ports on a card.
- The **Help** button activates context sensitive help.

The Payload ethernet PM parameters are shown in the following table.

Table 2: Payload Ethernet PM Parameters

Payload Ethernet PM Parameters

IfInOctets	etherStatsUndersizePkts
rxTotalPkts	etherStatsFragments
ifInUcastPkts	etherStatsPkts64Octets
ifInMulticastPkts	etherStatsPkts65to127Octets
ifInBroadcastPkts	etherStatsPkts128to255Octets
ifInErrors	etherStatsPkts256to511Octets
ifOutOctets	etherStatsPkts512to1023Octets
txTotalPkts	etherStatsPkts1024to1518Octets
ifOutUcastPkts	etherStatsBroadcastPkts
ifOutMulticastPkts	etherStatsMulticastPkts
ifOutBroadcastPkts	etherStatsOversizePkts
dot3StatsAlignmentErrors	etherStatsJabbers etherStatsOctets
dot3StatsFCSErrors	
dot3StatsFrameTooLong	

The Payload SONET PM parameters are shown in the following table.

Table 3: Payload SONET PM Parameters

Payload SONET PM Parameters	**Definition**
CV-S	Section Coding Violation (CV-S) is a count of bit interleaved parity (BIP) errors detected at the section layer (that is, using the B1 byte in the incoming SONET signal). Up to eight section BIP errors can be detected per STS-N frame; each error increments the current CV-S second register.
ES-S	Section Coding Violation (CV-S) is a count of bit interleaved parity (BIP) errors detected at the section layer (that is, using the B1 byte in the incoming SONET signal). Up to eight section BIP errors can be detected per STS-N frame; each error increments the current CV-S second register.
SES-S	Section Severely Errored Seconds (SES-S) is a count of the seconds when K (see Telcordia GR-253 for value) or more section-layer BIP errors were detected or an SEF or LOS defect was present.
SEFS-S	Severely Errored Framing Seconds (SEFS-S) is a count of the seconds when an SEF defect was present. An SEF defect is expected to be present during most seconds when an LOS or loss of frame (LOF) defect is present. However, there can be situations when the SEFS-S parameter is only incremented based on the presence of the SEF defect.
CV-L	Line Coding Violation (CV-L) indicates the number of coding violations occurring on the line. This parameter is a count of bipolar violations (BPVs) and excessive zeros (EXZs) occurring over the accumulation period.
ES-L	Line Errored Seconds (ES-L) is a count of the seconds containing one or more anomalies (BPV + EXZ) and/or defects (that is, loss of signal) on the line.
SES-L	Line Severely Errored Seconds (SES-L) is a count of the seconds containing more than a particular quantity of anomalies (BPV + EXZ > 44) and/or defects on the line.

UAS-L	Line Unavailable Seconds (UAS-L) is a count of the seconds when the line is unavailable. A line becomes unavailable when ten consecutive seconds occur that qualify as SES-Ls, and it continues to be unavailable until ten consecutive seconds occur that do not qualify as SES-Ls.
FC-L	Line Failure Count (FC-L) is a count of the number of near-end line failure events. A failure event begins when an Alarm Indication Signal Line (AIS-L) failure is declared or when a lower-layer, traffic-related, near-end failure is declared. This failure event ends when the failure is cleared. A failure event that begins in one period and ends in another period is counted only in the period where it begins.

The Payload SDH PM parameters are shown in the following table.

Table 4: Payload SDH PM Parameters

Payload SDH PM Parameters	**Definition**
EB	Errored block indicates that one or more bits are in error within a block.
BBE	Background block error shows the number of background block errors recorded during the PM time interval.
ES	Errored Seconds shows the number of errored seconds recorded during the PM time interval.
SES	Severely Errored Seconds shows the severely errored seconds recorded during the PM time interval.
UAS	Unavailable Seconds shows the unavailable seconds recorded during the PM time interval.
ESR	Errored Seconds Ratio shows the severely errored seconds ratio recorded during the PM time interval.
SESR	Severely Errored Seconds Ratio shows the severely errored seconds ratio recorded during the PM time interval.
BBER	Background Block Errors Ratio shows the background block errors ratio recorded during the PM time interval.

RMONs Supported by TNC, TNCE, and TNCS Cards

The full RMON statistics that are supported by the TNC, TNCE, and TNCS cards are shown in the following table.

Table 5: Full RMON Statistics on TNC, TNCE, and TNCS Cards

Full RMON Statistics

ifInOctets	etherStatsPkts65to127Octets
rxTotalPkts	etherStatsPkts128to255Octets
ifInUcastPkts	etherStatsPkts256to511Octets
ifInMulticastPkts	etherStatsPkts512to1023Octets
ifInBroadcastPkts	etherStatsPkts1024to1518Octets
ifInErrors	etherStatsBroadcastPkts
ifOutOctets	etherStatsMulticastPkts
txTotalPkts	etherStatsOversizePkts
ifOutUcastPkts	etherStatsJabbers etherStatsOctets
ifOutMulticastPkts	
ifOutBroadcastPkts	
dot3StatsAlignmentErrors	
dot3StatsFCSErrors	
dot3StatsFrameTooLong	
etherStatsUndersizePkts	
etherStatsFragments	
etherStatsPkts64Octets	

Transponder, Muxponder, Xponder, ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE Card Performance Monitoring

This section lists PM parameters for transponder cards (TXP_MR_10G, TXP_MR_2.5G, TXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, and TXP_MR_10E_L, 40E-TXP-C and 40ME-TXP-C40E-TXP-C, and 40ME-TXP-C, and 40G-TXP-C), muxponder cards (MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_MR_2.5G, MXPP_MR_2.5G, MXP_MR_10DME-C, MXP_MR_10DME-L, 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C), Xponder cards (GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, OTU2_XP), ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC, 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE cards. The transponder, muxponder, Xponder, and ADM-10G PM parameters are divided into Optics PM, Payload PM, and OTN PM tabs. The tabs displayed vary depending on the card installed. For more information, see the "Optics PM Window, on page 11" section, the "Payload PM Window, on page 13" section, or the "OTN PM Window, on page 23" section.

Note For the OTU2_XP card, if the PPM is not deleted properly from the CTC (but physically removed), the PMs continue to increase (even if the PPM is not present). To ensure the PMs do not increase when the PPM is not present, change the Service State of the PPM port to OOS (ANSI) or locked (ETSI) and move it back to IS (ANSI) or Unlocked (ETSI) state.

Optics PM Window

The Optics PM window lists parameters at the trunk and client side for all transponder, muxponder, Xponder (GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, OTU2_XP), ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC, 10x10G-LC, 200G-CK-LC, 400G-XP-LC, WSE, AR_MXP, AR_XP, and AR_XPE cards. The Optics PM window provides buttons to change the statistical values shown. The Refresh button manually refreshes statistics. Auto-Refresh sets a time interval at which automatic refresh occurs. In the Historical PM subtab, the Clear button sets the values on the card to zero. All counters on the card are cleared. The Help button activates context sensitive help. The trunk-side and client-side optics PM parameters are shown in the following table.

Table 6: Trunk-Side Client-Side Optics PM Parameters

Trunk-Side/Client-Side Optics PM Parameters	**Definition**
Laser Bias (Avg, %)	Average Laser Bias Current (Laser Bias Avg) is the average percentage of laser bias current during the PM time interval.
Laser Bias (Max,%)	Maximum Laser Bias Current (Laser Bias Max) is the maximum percentage of laser bias current during the PM time interval.
Laser Bias (Min,%)	Minimum Laser Bias Current (Laser Bias Min) is the minimum percentage of laser bias current during the PM time interval.
Link Status	Indicates if the Fibre Channel link is receiving a valid Fibre Channel signal (carrier) from the attached Fibre Channel device. Up means present, and down means not present. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, 100G-LC-C, 100G-CK-C, 100GS-CK-LC, 200G-CK-LC, 400G-XP-LC, and 10x10G-LC cards.
Rx Optical Pwr (Min,dBm)	Minimum Receive Optical Power (Rx Optical Pwr Min, dBm) is the minimum received optical power during the PM time interval.
Rx Optical Pwr (Avg,dBm)	Average Receive Optical Power (Rx Optical Pwr Avg, dBm) is the average received optical power during the PM time interval.
Rx Optical Pwr (Max,dBm)	Maximum Receive Optical Power (Rx Optical Pwr Max, dBm) is the maximum received optical power during the PM time interval.
Tx Optical Pwr (Min,dBm)[1]	Minimum Transmit Optical Power (Tx Optical Pwr Min, dBm) is the minimum optical power transmitted during the PM time interval.
Tx Optical Pwr (Avg,dBm)[1]	Average Transmit Optical Power (Tx Optical Pwr Avg, dBm) is the average optical power transmitted during the PM time interval.
Tx Optical Pwr (Max,dBm)[1]	Maximum Transmit Optical Power (Tx Optical Pwr Max, dBm) is the maximum optical power transmitted during the PM time interval.
CD (Min,ps/nm)[2]	Minimum Chromatic Dispersion (CD Min, ps/nm) is the minimum chromatic dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.
CD (Avg,ps/nm)[2]	Average Chromatic Dispersion (CD Avg, ps/nm) is the average chromatic dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.

CD (Max,ps/nm)[2]	Maximum Chromatic Dispersion (CD Max, ps/nm) is the maximum chromatic dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.
OSNR (Min,dB)[2]	Minimum Optical Signal to Noise Ratio (OSNR Min, dB) is the minimum optical signal to noise ratio during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.
OSNR (Avg,dB)[2]	Average Optical Signal to Noise Ratio (OSNR Avg, dB) is the average optical signal to noise ratio during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.
OSNR (Max,dB)[2]	Maximum Optical Signal to Noise Ratio (OSNR Max, dB) is the maximum optical signal to noise ratio during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, and 10x10G-LC cards.
PMD (Min,ps)[2]	Minimum Polarization Mode Dispersion (PMD Min, ps) is the minimum polarization mode dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, 400G-XP-LC, and 10x10G-LC cards.
PMD (Avg,ps)[2]	Average Polarization Mode Dispersion (PMD Avg, ps) is the average polarization mode dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, 400G-XP-LC, and 10x10G-LC cards.
PMD (Max,ps)[2]	Maximum Polarization Mode Dispersion (PMD Max, ps) is the maximum polarization mode dispersion during the PM time interval. Not supported on AR_MXP, AR_XP, AR_XPE, WSE, 400G-XP-LC, and 10x10G-LC cards.
SOPMD (Min,ps^2)	Minimum Second-order Polarization Mode Dispersion (SOPMD Min,ps^2) is the minimum second-order polarization mode dispersion during the PM time interval. Not supported on WSE and 10x10G-LC cards.
SOPMD (Avg,ps^2)	Average Second-order Polarization Mode Dispersion (SOPMD Avg,ps^2) is the average second-order polarization mode dispersion during the PM time interval. Not supported on WSE and 10x10G-LC cards.
SOPMD (Max,ps^2)	Maximum Second-order Polarization Mode Dispersion (SOPMD Max,ps^2) is the maximum second-order polarization mode dispersion during the PM time interval. Not supported on WSE and 10x10G-LC cards.
PCR (Min,10*rad/s)	Minimum Polarization Change Rate (PCR Min,10*rad/s) is the minimum polarization change rate during the PM time interval. Not supported on WSE, 400G-XP-LC, and 10x10G-LC cards.
PCR (Avg,10*rad/s)	Average Polarization Change Rate (PCR Avg,10*rad/s) is the average polarization change rate during the PM time interval. Not supported on WSE, 400G-XP-LC, and 10x10G-LC cards.

PCR (Max,10*rad/s)	Maximum Polarization Change Rate (PCR Max,10*rad/s) is the maximum polarization change rate during the PM time interval. Not supported on WSE, 400G-XP-LC, and 10x10G-LC cards.
PDL (Min,dB)	Minimum Polarization Dependent Loss (PDL Min,dB) is the minimum polarization dependent loss during the PM time interval. Not supported on WSE and 10x10G-LC cards.
PDL (Avg,dB)	Average Polarization Dependent Loss (PDL Avg,dB) is the average polarization dependent loss during the PM time interval. Not supported on WSE and 10x10G-LC cards.
PDL (Max,dB)	Maximum Polarization Dependent Loss (PDL Avg,dB) is the maximum polarization dependent loss during the PM time interval. Not supported on and WSE 10x10G-LC cards.

[1] On the trunk side, this PM is not available for the following cards: TXP_MR_2.5G, TXPP_MR_2.5G, MXP_MR_2.5G, and MXPP_MR_2.5G.

[2] On the trunk side, this PM is available for the following cards: 40G-MXP-C, 40E-MXP-C, 40ME-MXP-C, 40E-TXP-C, and 40ME-TXP-C.

Payload PM Window

The Payload PM window subtabs change depending on the card provisioning. For more information about provisioning TXP, MXP, and Xponder cards, refer to the "Provision Transponder and Muxponder Cards" chapter in the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. Possible Payload PM subtabs are: SONET, SDH, Statistics, Utilization, and History. The following buttons function the same on all of the tabs. Not all tabs have all of these buttons.

- The **Refresh** button manually refreshes statistics.
- The **Auto-Refresh** button sets a time interval at which automatic refresh occurs.
- The **Baseline** button resets the displayed statistics values to zero.
- (Statistics window only) The **Clear** button allows you to set the values to zero for displayed statistics, all statistics for a port, and all statistics for all optical ports on a card.
- The **Help** button activates context sensitive help.

The options selected in the Provisioning tab can affect the parameters displayed in the Performance > Payload PM tab.

The PM parameter types that appear when a particular port type is provisioned for a transponder or muxponder card are shown in the following table.

Table 7: Transponder, Muxponder, and Xponder Port Type PM Provisioning Options

If this Port Type is Provisioned[3]	The Following PM Types are Activated[4]

SONET/SDH (including 10G Ethernet WAN Phy) OC3/STM1 OC12/STM4 OC48/STM16 OC192/STM64	SONET or SDH PMs
40G Ethernet LAN Phy 10G Ethernet LAN Phy 10G FiberChannel 8G FiberChannel ONE_GE FC1G FC2G FC1G ISL FC2G ISL FICON1G FICON2G FICON1G ISL FICON2G ISL ISC COMPAT ISC PEER OTU2 OTU3 OTU4	Full remote monitoring (RMON) statistics
ESCON DV6000 SDI_D1_VIDEO HDTV PASS_THRU ETR_CLO	Payload PMs are not applicable to 2R port types.

[3] The port type is provisioned from card view on the Provisioning > Pluggable Port Modules tab. For pluggable port module (PPM) provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide and Cisco NCS 2000 Series Line Card Configuration Guide*.

[4] Performance monitoring parameters are displayed from the card view on the Performance tab.

Payload PM SONET/SDH Window

Table 8: ONS 15454 and NCS SONET/SONET Layer Far-End and Near-End PMs, on page 15 lists the SONET/SDH layer near-end and far-end PM parameters listed in the card view on the Performance > Payload PM > SONET or SDH tab. SONET/SDH layer PMs are available when the client type is set to OC-3/STM-1, OC-12/STM-4, or OC-48/STM-16 on the TXP_MR_2.5G or when OC-192/STM-64 is set on the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, 40E-TXP-C, 40ME-TXP-C, 40G-TXP-C, ADM-10G, WSE, 10x10G-LC, or OTU2_XP card on the ONS 15454 and NCS SONET nodes or ONS 15454 and NCS SDH nodes. OC-48/STM-16 trunk PMs are available on the MXP_MR_2.5G and MXPP_MR_2.5G cards on the ONS 15454 and NCS SONET or ONS 15454 and NCS SDH nodes. OC-48/STM-16 client PMs are available on the MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, and MXP_2.5G_10E_L cards on the ONS 15454 and NCS SONET or ONS 15454 and NCS SDH nodes. OC-192/STM-64 client PMs are available on the 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C cards on the ONS 15454 and NCS SONET or ONS 15454 and NCS SDH nodes. For PM definitions, see Table 35: SONET PM Parameters, on page 42 and Table 36: SDH PM Parameters, on page 43

Table 8: ONS 15454 and NCS SONET/SONET Layer Far-End and Near-End PMs

SONET	**Layer Far-End (FE)**[5,6]	**Layer Near-End** [1, 2]	**Note**
	CV-LFE ES-LFE FC-LFE SES-LFE UAS-LFE	CV-L CV-S ES-L ES-S FC-L SES-L SES-S SEF-S UAS-L	Applicable standard is Telcordia GR-253.

SDH	MS-BBE MS-BBER MS-EB MS-ES MS-ESR MS-SES MS-SESR MS-UAS	RS-BBE RS-BBER RS-EB RS-ES RS-ESR RS-SES RS-SESR RS-UAS MS-BBE MS-BBER MS-EB MS-ES MS-ESR MS-SES MS-SESR MS-UAS	Applicable standard is Telcordia GR-253.

[5] Applicable to optical channel (OCH) and Client (CLNT) facilities.
[6] For MXP_MR_2.5G and MXPP_MR_2.5G cards, these parameters are shown in the Performance > Payload PM > SONET PM tabs in the card view.

Payload PM Statistics Window

Table 9: Full RMON Statistics on 40E-TXP-C and 40ME-TXP-C Cards, on page 16 lists the 40 Gigabit Ethernet (40 GE) payload statistics that are available on the 40E-TXP-C, and 40ME-TXP-C cards. The parameters are listed under the card view on the Performance > Payload PM > Statistics tab. For 40 GE payload definitions, see Table 33: Full RMON Statistics PM Definitions, on page 37.

Note Utilization PMs are also available per port.

Table 9: Full RMON Statistics on 40E-TXP-C and 40ME-TXP-C Cards

Full RMON Statistics

dot3StatsFCSErrors	etherStatsBroadcastPkts
dot3StatsFrameTooLong	etherStatsCRCAlignErrors
dot3StatsInPauseFrames	etherStatsFragments
dot3StatsOutPauseFrames	etherStatsJabbers
ifInUcastPkts	etherStatsMulticastPkts
inInMulticastPkts	etherStatsOctets
ifInBroadcastPkts	etherStatsOversizePkts
ifInErrors	etherStatsPkts64Octets
ifInErrorsBytePkts	etherStatsPkts65to127Octets
ifInFramingErrorPkts	etherStatsPkts128to255Octets
ifInJunkInterPkts	etherStatsPkts256to511Octets
ifInMulticastPkts	etherStatsPkts512to1023Octets
ifInOctets	etherStatsPkts1024to1518Octets
ifOutBroadcastPkts	etherStatsUndersizePkts
ifOutMulticastPkts	etherStatsPkts rxControlFrames
ifOutOctets	rxPauseFrames
rxTotalPkts	rxUnknownOpcodeFrames
Time Last Cleared	
txTotalPkts	

Table 21-8 lists the 40 Gigabit Ethernet (40 GE) payload statistics that are available on the 40G-TXP-C card. The parameters are listed under card view on the Performance > Payload PM > Statistics tab. For 40 GE payload definitions, see Table 21-35 on page 21-30.

Note Utilization PMs are also available per port.

Table 10: Full RMON Statistics on TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP Cards, on page 18lists the 10 Gigabit Ethernet (10 GE) payload statistics that are available on the TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, ADM-10G, and OTU2_XP cards. PPM provisioning must be completed in the card view, on the Provisioning > Pluggable Port Modules tab for 10 GE to be enabled. For PPM provisioning procedures, see the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. The parameters are listed in card view on the Performance > Payload PM > Statistics tab. For 10 GE payload definitions, see Table 33: Full RMON Statistics PM Definitions, on page 37.

Note Utilization PMs are also available per port.

Table 10: Full RMON Statistics on TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP Cards

Full RMON Statistics	
dot3StatsFCSErrors	etherStatsBroadcastPkts
dot3StatsFrameTooLong	etherStatsCRCAlignErrors
ifInUcastPkts	etherStatsFragments
ifInBroadcastPkts	etherStatsJabbers
ifInErrors	etherStatsMulticastPkts
ifInErrorsBytePkts	etherStatsOctets
ifInFramingErrorPkts	etherStatsOversizePkts
ifInJunkInterPkts	etherStatsPkts64Octets
ifInMulticastPkts	etherStatsPkts65to127Octets
ifInOctets	etherStatsPkts128to255Octets
ifOutBroadcastPkts	etherStatsPkts256to511Octets
ifOutMulticastPkts	etherStatsPkts512to1023Octets
ifOutOctets	etherStatsPkts1024to1518Octets
rxTotalPkts	etherStatsUndersizePkts
Time Last Cleared	rxControlFrames
txTotalPkts	rxPauseFrames
	rxUnknownOpcodeFrames

The payload statistics that are available on the ADM-10G card are shown in the following table. The parameters are listed in card view on the Performance > Payload PM > Statistics tab. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.

Table 11: Full RMON Statistics on ADM-10G Card

Full RMON Statistics

dot3StatsFCSErrors	etherStatsBroadcastPkts
dot3StatsFrameTooLong	etherStatsFragments
dot3StatsInPauseFrames	etherStatsJabbers
dot3StatsOutPauseFrames	etherStatsMulticastPkts
dot3StatsControlInUnknownOpCodes	etherStatsOversizePkts
ifInMulticastPkts	etherStatsPkts64Octets
ifInBroadcastPkts	etherStatsPkts65to127Octets
ifInErrors	etherStatsPkts128to255Octets
ifInErrorsBytePkts	etherStatsPkts256to511Octets
ifInOctets	etherStatsPkts512to1023Octets
ifOutOctets	etherStatsPkts1024to1518Octets
rxTotalPkts	etherStatsUndersizePkts
txTotalPkts	
ifInErrors	
gfpStatsRxCRCErrors	
gfpStatsRxSBitErrors	
ifInPayloadCrcErrors	
gfpStatsLFDRaisedgfpStatsRxFrame	
gfpStatsTxOctets	
gfpStatsRxMBitErrors	
gfpStatsRxTypeInvalid	

Table 12: Gigabit Ethernet (GE) or Fibre Channel (FC) Payload PMs for the TXP_MR_2.5G and TXPP_MR_2.5G Cards , on page 19 lists the payload PM parameters that are available on the TXP_MR_2.5G and the TXPP_MR_2.5G cards when the ONE_GE or FC1G client type is enabled. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. For payload definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section and the "Full RMON Statistics PM Parameter Definitions, on page 37" section.

Note Payload PM is not available for the 2 FC client type.

Table 12: Gigabit Ethernet (GE) or Fibre Channel (FC) Payload PMs for the TXP_MR_2.5G and TXPP_MR_2.5G Cards

GE or FC Payload Performance Parameters

8b/10bDataOrderedSets
8b/10bIdleOrderedSets
8b/10bNonIdleOrderedSets
8b/10bStatsEncodingDispErrors
ifInErrors
rxTotalPkts

The payload PM parameters that are available on the OTU2_XP card when the 10G FC client type is enabled is shown in the following table. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. For payload definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section and the "Full RMON Statistics PM Parameter Definitions, on page 37" section.

Table 13: 10G Fibre Channel (FC) Payload PMs for the OTU2_XP Card

10G FC Payload Performance Parameters
rxTotalPkts
mediaIndStatsRxFramesTruncated
mediaIndStatsRxFramesTooLong
mediaIndStatsRxFrameBadCRC
ifInOctects
ifInErros

For payload definitions, see the "Optics and 8b10b PM Parameter Definitions" section and the "Full RMON Statistics PM Parameter Definitions" section.

The payload PM parameters that are available on the MXP_MR_2.5G and the MXPP_MR_2.5G cards when the ONE_GE or the FC1G client type is enabled are shown in the following table. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. For payload definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section and the "Full RMON Statistics PM Parameter Definitions, on page 37" section.

Table 14: ONE_GE or FC1G Payload PMs for the MXP_MR_2.5G and MXPP_MR_2.5G Cards

ONE_GE or FC1G Payload Performance Parameters

8b10bInvalidOrderedSets
8b10bStatsEncodingDispErrors
ifInDiscards
ifInErrors
ifInOctets
ifOutDiscards
ifOutOctets
mediaIndStatsRxFramesBadCRC
mediaIndStatsRxFramesTooLong
mediaIndStatsRxFramesTruncated
mediaIndStatsTxFramesBadCRC
rxTotalPkts
txTotalPkts

Tthe FC client-side payload PM parameters are shown in the following table. FC payload PMs are available on the FC port on both the MXP_MR_2.5G and the MXPP_MR_2.5G cards when the FC1G client type is enabled. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. For payload definitions, see the "Full RMON Statistics PM Parameter Definitions, on page 37" section.

Table 15: FC1G Payload PMs on the Client Side

FC1G Payload PMs on the Client Port
fcStatsLinkRecoveries
fcStatsRxCredits
fcStatsTxCredits
fcStatsZeroTxCredits
gfpStatsRoundTripLatencyUSec
gfpStatsRxDistanceExtBuffers
gfpStatsTxDistanceExtBuffers

The Transparent Generic Framing Procedure (GFP-T) payload PMs are shown in the following table. The GFP-T payload PMs are available on the GFP port on both the MXP_MR_2.5G and the MXPP_MR_2.5G cards when the ONE_GE or the 1 FC client type is enabled. GFP-T payload PMs are also available on the client port on both the MXP_MR_2.5G and the MXPP_MR_2.5G cards when the 1 FC client type is enabled. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. For payload definitions, see the "Full RMON Statistics PM Parameter Definitions, on page 37" section.

Table 16: GFP-T Payload PMs

GFP-T Payload PMs on the GFP Port

gfpStatsCSFRaised
gfpStatsLFDRaised
gfpStatsRxCRCErrors
gfpStatsRxMBitErrors
gfpStatsRxSBitErrors
gfpStatsRxTypeInvalid
gfpStatsRxFrame
gfpStatsTxFrame
gfpStatsRxSblkCRCErrors
gfpStatsRxOctets
gfpStatsTxOctets
gfpRxCmfFrame
gfpTxCmfFrame

MXP_MR_2.5G/MXPP_MR_2.5G Payload Utilization Window

The Payload PM Utilization window in the card view Performance > Payload> Utilization tab shows the percentage of transmit (Tx) and receive (Rx) line bandwidth used by the ports during consecutive time segments. This tab cannot be viewed unless the appropriate PPM port type is provisioned. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide and Cisco NCS 2000 Series Line Card Configuration Guide*. The Utilization window provides an Interval list that enables you to set time intervals of 15 minutes or 1 day. Line utilization is calculated with the following formulas:

Rx = (inOctets + inPkts * 20) * 8 / 100% interval * maxBaseRate

Tx = (outOctets + outPkts * 20) * 8 / 100% interval * maxBaseRate

The interval is defined in seconds. The maxBaseRate is defined by raw bits per second in one direction for the port (that is, 1 Gbps). The maxBaseRate for MXP_MR_2.5G and MXPP_MR_2.5G cards is shown for the ONS 15454 and NCS nodes in the following table.

Table 17: maxBaseRate for STS and VC Circuits

STS/VC	maxBaseRate
STS-1/VC3	51840000
STS-3c/VC4	155000000
STS-6c/VC4-2c	311000000
STS-12c/VC4-4c	622000000

Note Line Utilization numbers express the average of ingress and egress traffic as a percentage of capacity.

Payload History Window

The Payload PM History window in the card view Performance > Payload > History tab lists past statistics for the previous time intervals. This tab cannot be viewed unless the appropriate PPM port type is provisioned. For PPM provisioning procedures, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*. Depending on the selected time interval, the History window displays the statistics for each port for the number of previous time intervals as shown in the following table.

Table 18: History Statistics per Time Interval

Time Interval	Number of Intervals Displayed
15 minutes	32 (current and previous)
1 day (24 hours)	2 (current and previous)

OTN PM Window

The OTN tab has an ITU-T G.709 PM subtab and an FEC PM subtab. Both subtabs provide buttons to change the statistical values shown in the Performance tab. The Refresh button manually refreshes statistics. Auto-Refresh sets a time interval at which automatic refresh occurs. The Baseline button resets the displayed statistics values to zero. The Statistics window also has a Clear button. The Clear button sets the values on the card to zero. All counters on the card are cleared. The Help button activates context sensitive help. For more information about provisioning optical transport network (OTN) settings, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.

The OTN PM provisioning options for all transponder, muxponder, Xponder (GE_XP, 10GE_XP, GE_XPE, 10GE_XPE), and ADM-10G cards are shown in the following table. The options selected in the Provisioning tab affects the parameters displayed in the Performance > OTN PM tab.

Table 19: Transponder, Muxponder, and Xponder PM Provisioning Options

Card	OTN Provisioning[7]
MXPP_MR_2.5G	—
MXP_2.5G_10E	G.709 FEC FEC Thresholds
MXP_2.5G_10E_C	G.709 FEC FEC Thresholds
MXP_2.5G_10E_L	G.709 FEC FEC Thresholds

MXP_2.5G_10G	G.709 FEC FEC Thresholds
MXP_MR_2.5G	—
MXP_MR_10DME_C	G.709 FEC FEC Thresholds
MXP_MR_10DME_L	G.709 FEC FEC Thresholds
40G-MXP-C	G.709 FEC Thresholds Trail Trace Identifier
40E-MXP-C	G.709 FEC Thresholds Trail Trace Identifier
40ME-MXP-C	G.709 FEC Thresholds Trail Trace Identifier
TXPP_MR_2.5G	G.709 FEC FEC Thresholds
TXP_MR_10E	G.709 FEC FEC Thresholds
TXP_MR_10E_C	G.709 FEC FEC Thresholds
TXP_MR_10E_L	G.709 FEC FEC Thresholds

TXP_MR_10G	G.709 FEC FEC Thresholds
TXP_MR_2.5G	G.709 FEC FEC Thresholds
40E-TXP-C	G.709 FEC Thresholds Trail Trace Identifier
40ME-TXP-C	G.709 FEC Thresholds Trail Trace Identifier
40G-TXP-C	G.709 FEC Thresholds Trail Trace Identifier
ADM-10G	G.709 FEC FEC Thresholds
GE_XP	G.709 FEC FEC Thresholds
10GE_XP	G.709 FEC FEC Thresholds
GE_XPE	G.709 FEC FEC Thresholds
10GE_XPE	G.709 FEC FEC Thresholds

OTU2_XP	G.709 FEC FEC Thresholds
AR_MXP	G.709 FEC FEC Thresholds
AR_XP	G.709 FEC FEC Thresholds
AR_XPE	G.709 FEC FEC Thresholds
100G-LC-C, 100GS-CK-LC , 200G-CK-LC, and 100G-CK-C	G.709 FEC Thresholds Trail Trace Identifier

[7] OTN provisioning is performed from card view on the Provisioning > OTN > OTN Lines, G.709 Thresholds, and FEC Thresholds tabs.

The OTN trunk-side PM parameters listed on the G.709 tab are shown in the following table. OTN PMs are available when ITU G.709 is enabled from the card view Provisioning > OTN > OTN Lines tab. OTN PMs are not available on MXP_MR_2.5G and MXPP_MR_2.5G cards. For ITU G.709 section and path monitoring PM definitions, see the "ITU G.709 and ITU-T G.8021 Trunk-Side PM Parameter Definitions , on page 36" section.

Table 20: ITU-T G.709 OTN Trunk-Side PMs

OTN Layer (Near End and Far End)[8]	**Note**
BBE-SM BBER-SM ES-SM ESR-SM FC-SM SES-SM SESR-SM UAS-SM FC-SM	ITU G.709 standard section monitoring ITU-T G.8021 G.709 FEC Thresholds Trail Trace Identifier

BBE-PM BBER-PM ES-PM ESR-PM FC-PM SES-PM SESR-PM UAS-PM	ITU G.709 standard path monitoring ITU-T G.8021 G.709 FEC Thresholds Trail Trace Identifier

[8] Applicable to OCH facility.

The forward error correction (FEC) PM parameters are shown in the following table. FEC PMs are available when ITU-T G.709 is enabled and FEC is set to standard or enhanced. These parameters are provisioned from the card view Provisioning > OTN > OTN Lines tab. FEC PMs are not available on MXP_MR_2.5G and MXPP_MR_2.5G cards. For PM definitions, see the "FEC PM Parameter Definitions, on page 41" section.

Table 21: FEC OTN Trunk-Side PMs

FEC Trunk-Side PMs	**FEC (Near End)**[9]
Bit Errors	BIT-EC
Uncorrectable Words	UNC-WORDS
Pre FEC BER	Pre FEC BER

[9] Applicable to OCH facility.

ONS 15454 optics, NCS optics, and 8b10b PM parameters are shown in the following table. For ONS 15454 optics, NCS optics, and 8b10b definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section.

Table 22: ONS 15454 Optics, NCS Optics, and 8b10b PMs

Optics (Near End)[10]	**8B10B (Near End)**[11]
LBCL-AVG LBCL-MAX LBCL-MIN OPT-AVG OPT-MAX OPT-MIN OPR-AVG OPR-MAX OPR-MIN	CGV DCG IOS IPC NIOS VPC

[10] The TXP_MR_2.5G, TXPP_MR_2.5G, AR_MXP, AR_XP, and AR_XPE card Enterprise System Connection (ESCON) payload does not support optics PMs on the client port due to Small Form-factor Pluggable (SFP)-imposed restrictions.

[11] Applicable to TXP_MR_2.5G and TXPP_MR_2.5G cards only.

Ether Ports PM Window

CTC provides Ethernet port performance information, including line-level parameters, port bandwidth consumption, and historical Ethernet statistics. The Ethernet performance information is divided into the Statistics, Utilization, and History tabbed windows within the card view Performance tab window. For more information about provisioning ether ports, refer to the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.

Ether Port Statistics Window

The Ethernet Statistics window lists Ethernet parameters at the line level. The Statistics window provides buttons to change the statistical values shown. The Baseline button resets the displayed statistics values to zero. The Refresh button manually refreshes statistics. Auto-Refresh sets a time interval at which automatic refresh occurs.

The following table defines the Ethernet Port statistics parameters.

Table 23: E-Series Ethernet Statistics Parameters

Parameter	Definition
Time Last Cleared	A time stamp indicating the last time statistics were reset.
ifInOctets	Number of bytes received since the last counter reset.
rxTotalPks	Number of received packets.
ifInUcastPkts	Number of unicast packets received since the last counter reset.
ifInMulticastPkts	Number of multicast packets received since the last counter reset.
ifInDiscards	The number of inbound packets that were chosen to be discarded even though no errors had been detected to prevent their being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free buffer space.
ifOutOctets	Number of bytes transmitted since the last counter reset.
txTotalPkts	Number of transmitted packets.
ifOutMulticastPkts	Number of multicast packets transmitted.
ifOutBroadcastPkts	Number of broadcast packets transmitted.
ifOutDiscards	Number of outbound packets which were chosen to be discarded even though no errors had been detected to prevent their transmission. A possible reason for discarding such packets could be to free up buffer space.
ifOurErrors	Number of outbound packets or transmission units that could not be transmitted because of errors.

dot3StatsAlignmentErrors	A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check.
dot3StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3StatsFrameTooLong	A count of frames received on a particular interface that exceed the maximum permitted frame size.
etherStatsUndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsFragments	The total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error). **Note** It is entirely normal for etherStatsFragments to increment. This is because it counts both runts (which are normal occurrences due to collisions) and noise hits.
etherStatsPkts64Octets	The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).
etherStatsPkts65to127Octets	The total number of packets (including bad packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	The total number of packets (including bad packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	The total number of packets (including bad packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	The total number of packets (including bad packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1024to1518Octets	The total number of packets (including bad packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsBroadcastPkts	The total number of good packets received that were directed to the broadcast address. Note that this does not include multicast packets.

etherStatsMulticastPkts	The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed. Note that for tagged interfaces, this number becomes 1522 bytes.
etherStatsJabbers	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).
etherStatsOctets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets.
etherStatsCRCAlignErrors	The total number of packets received that had a length (excluding framing bits, but including FCS octets) of between 64 and 1518 octets, inclusive, but had either a bad FCS with an integral number of octets (FCS Error) or a bad FCS with a nonintegral number of octets (Alignment Error).

Note In certain congestion scenarios in GE_XP and 10GE_XP cards, dropped packets are counted both in ingress (IfIndiscards) and egress interface (IfOutDiscards) interface. As a result of this, some dropped packets are counted twice. The dropped packets on ingress interface can be ignored under this scenario.

Ether Ports Utilization Window

The Utilization window shows the percentage of transmit (Tx) and receive (Rx) line bandwidth used by the Ethernet ports during consecutive time segments. The Mode field displays the real-time mode status, such as 100 Full, which is the mode setting configured on the E-Series port. However, if the E-Series port is set to autonegotiate the mode (Auto), this field shows the result of the link negotiation between the E-Series and the peer Ethernet device attached directly to the E-Series port.

The Utilization window provides an Interval drop-down list that enables you to set time intervals of 1 minute, 15 minutes, 1 hour, and 1 day. Line utilization is calculated with the following formulas:

Rx = (inOctets + inPkts * 20) * 8 / 100% interval *
maxBaseRate

Tx = (outOctets + outPkts * 20) * 8 / 100% interval *
maxBaseRate

The interval is defined in seconds. The maxBaseRate is defined by raw bits per second in one direction for the Ethernet port (that is, 1 Gbps).

Ether Port History Window

The Ether Port History window lists past Ethernet statistics for the previous time intervals. Depending on the selected time interval, the History window displays the statistics for each port for the number of previous time intervals as shown in the following table. The parameters are defined in Table 23: E-Series Ethernet Statistics Parameters, on page 28.

Table 24: Ethernet History Statistics per Time Interval

Time Interval	Number of Previous Intervals Displayed
1 minute	60
15 minutes	32
1 hour	24
1 day (24 hours)	7

DWDM Card Performance Monitoring

The following sections define PM parameters and definitions for the ONS 15454 and NCS OPT-PRE, OPT-BST, OPT-BST-L, OPT-AMP-L, OPT-AMP-17-C, 32MUX-O, 32DMX-O, 32DMX, 32DMX-L, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 40-DMX-C, 40-DMX-CE, 40-MUX-C, 40-SMR1-C, 40-SMR2-C, 4MD-xx.x, OSCM, OSC-CSM, 32WSS, and DWDM cards.

Optical Amplifier Card Performance Monitoring Parameters

The PM parameters for the OPT-PRE, OPT-AMP-L, OPT-AMP-17-C, OPT-BST, and OPT-BST-L cards are shown in the following table. For ONS 15454 and NCS optics definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section.

Table 25: Optical PM Parameters for Optical Amplifier Cards

Optical Line	Optical Amplifier Line
OPT	OPR

Multiplexer and Demultiplexer Card Performance Monitoring Parameters

The PM parameters for the 32MUX-O, 32WSS, 32WSS-L, 32DMX, 32DMX-L, 32DMX-O, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 40-DMX-C, 40-DMX-CE, 40-MUX-C, 40-SMR1-C, and 40-SMR2-C cards are shown in the following table. For ONS 15454 and NCS optics definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section.

Table 26: Optical PM Parameters of Multiplexer and Demultiplexer Cards

Optical Channel	Optical Line
OPR	OPT

4MD-xx.x Card Performance Monitoring Parameters

The PM parameters for the 4MD-xx.x cards are shown in the following table. For ONS 15454 and NCS optics definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section.

Table 27: Optical PM Parameters for 4MD-xx.x Cards

Optical Channel	Optical Band
OPR	OPT

Optical Service Channel Card Performance Monitoring Parameters

The ONS 15454 and NCS ANSI node PM parameters for the OSCM and OSC-CSM cards are shown in the following table. For PM definitions, see the "SONET PM Parameter Definitions, on page 42" section. For optics PM definitions, see the "Optics and 8b10b PM Parameter Definitions, on page 32" section.

Table 28: ANSI OSCM/OSC-CSM (OC3) Card PMs

Section (Near End)[12]	Line (Near End/Far End)[1]	Optics (Near End) [13]
CV-S ES-S SEF-S SES-S	CV-L ES-L FC-L SES-L UAS-L	OPWR

[12] Applicable to OC3
[13] Applicable to OTS facilities

Table 29: ETSI OSCM and OSC-CSM Card PMs

Regeneration Section (Near End)	Multiplex Section (Near End/Far End)	Optics (Near End)
RS-BBE RS-EB RS-ES RS-SES	MS-BBE MS-EB MS-ES MS-SES MS-UAS	OPT

Optics and 8b10b PM Parameter Definitions

Cisco ONS 15454 optics, NCS optics, and 8b10b PM parameter definitions are shown in the following table.

Table 30: ONS 15454 Optics, NCS Optics, and 8b10b PM Parameter Definitions

Parameter	Definition
8b10bDataOrderedSets	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. DataOrderedSets is a count of data ordered sets.
8b10bErrors	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. Errors is a count of 10b errors received by the serial or deserializer (serdes 8b/10b).
8b10bIdleOrderedSets	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. IdleOrderedSets is a count of idle ordered sets.
8b10bInvalidOrderedSets	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. InvalidOrderedSets is a count of the received invalid work errors.
8b10bNonIdleOrderedSets	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. NonIdleOrderedSets is a count of ordered sets that are not idle.
8b10bStatsEncodingDispErrors	8b10b takes 8 bits of data and sends it as 10 bits, which allows control information to be sent along with the data. StatsEncodingDispErrors is a count of the received disparity errors.
BIE	The number of bit errors (BIE) corrected in the DWDM trunk line during the PM time interval.
BIT-EC	The number of Bit Errors Corrected (BIT-EC) in the DWDM trunk line during the PM time interval.
CGV	Code Group Violations (CGV) is a count of received code groups that do not contain a start or end delimiter.
DCG	Date Code Groups (DCG) is a count of received data code groups that do not contain ordered sets.
IOS	Idle Ordered Sets (IOS) is a count of received packets containing idle ordered sets.
IPC	Invalid Packets (IPC) is the count of received packets that contain errored data code groups that have start and end delimiters.
LBCL-AVG	Laser Bias Current Line-Average (LBCL-AVG) is the average percentage of laser bias current.
LBCL-MAX	Laser Bias Current Line-Maximum (LBCL-MAX) is the maximum percentage of laser bias current.

LBCL-MIN	Laser Bias Current Line-Minimum (LBCL-MIN) is the minimum percentage of laser bias current.
LOFC	Loss of Frame Count (LOFC) is a count of the lost frames.
NIOS	Non-Idle Ordered Sets (NIOS) is a count of received packets containing non-idle ordered sets.
OPR	Optical Power Received (OPR) is the measure of average optical power received as a percentage of the nominal OPR.
OPR-AVG	Average Receive Optical Power (OPR-AVG) is the average received optical power measured in dBm.
OPR-MAX	Maximum Receive Optical Power (OPR-MAX) is the maximum received optical power measured in dBm.
OPR-MIN	Minimum Receive Optical Power (OPR-MIN) is the minimum received optical power measured in dBm.
OPT	Optical Power Transmitted (OPT) is the average optical power transmitted as a percentage of the nominal OPT.
OPT-AVG	Average Transmit Optical Power (OPT-AVG) is the average transmitted optical power measured in dBm.
OPT-MAX	Maximum Transmit Optical Power (OPT-MAX) is the maximum transmitted optical power measured in dBm.
OPT-MIN	Minimum Transmit Optical Power (OPT-MIN) is the minimum transmitted optical power measured in dBm.
OPWR-AVG	Optical Power - Average (OPWR-AVG) is the measure of average optical power on the unidirectional port.
OPWR-MAX	Optical Power - Maximum (OPWR-MAX) is the measure of maximum value of optical power on the unidirectional port.
OPWR-MIN	Optical Power - Minimum (OPWR-MIN) is the measure of minimum value of optical power on the unidirectional port.
PMD-AVG	Average Polarization Mode Dispersion (PMD-AVG) is the average polarization mode dispersion value measured in ps.
PMD-MAX	Maximum Polarization Mode Dispersion (PMD-MAX) is the maximum polarization mode dispersion value measured in ps.
PMD-MIN	Minimum Polarization Mode Dispersion (PMD-MIN) is the minimum polarization mode dispersion value measured in ps.
CD-AVG	Average Chromatic Dispersion (CD-AVG) is the average chromatic dispersion value measured in ps.
CD-MAX	Maximum Chromatic Dispersion (CD-MAX) is the maximum chromatic dispersion value measured in ps.

CD-MIN	Minimum Chromatic Dispersion (CD-MIN) is the minimum chromatic dispersion value measured in ps.
SOPMD-AVG	Average Second-order Polarization Mode Dispersion (SOPMD-AVG) is the average second-order polarization mode dispersion measured in ps^2.
SOPMD-MAX	Maximum Second-order Polarization Mode Dispersion (SOPMD-MAX) is the maximum second-order polarization mode dispersion measured in ps^2
SOPMD-MIN	Minimum Second-order Polarization Mode Dispersion (SOPMD-MIN) is the minimum second-order polarization mode dispersion measured in ps^2
PCR-AVG	Average Polarization Change Rate (PCR-AVG) is the average polarization change rate measured in 10*rad/s.
PCR-MAX	Maximum Polarization Change Rate (PCR-MAX) is the maximum polarization change rate measured in 10*rad/s.
PCR-MIN	Minimum Polarization Change Rate (PCR-MIN) is the minimum polarization change rate measured in 10*rad/s.
PDL-AVG	Average Polarization Dependent Loss Signal (PDL-AVG) is the average polarization dependent loss measured in dB.
PDL-MAX	Maximum Polarization Dependent Loss Signal (PDL-MAX) is the maximum polarization dependent loss measured in dB.
PDL-MIN	Minimum Polarization Dependent Loss Signal (PDL-MIN) is the minimum polarization dependent loss measured in dB.
OSNR-AVG	Average Optical Signal to Noise Ratio (OSNR-AVG) is the average optical signal to noise ratio measured in dB.
OSNR-MAX	Maximum Optical Signal to Noise Ratio (OSNR-MAX) is the maximum optical signal to noise ratio measured in dB.
OSNR-MIN	Minimum Optical Signal to Noise Ratio (OSNR-MIN) is the minimum optical signal to noise ratio measured in dB.
UNC-WORDS	Uncorrectable Words (UNC-WORDS) is the number of uncorrectable words detected in the DWDM trunk line during the PM time interval.
VPC	Valid Packets (VPC) is a count of received packets that contain non-errored data code groups that have start and end delimiters.

ITU G.709 and ITU-T G.8021 Trunk-Side PM Parameter Definitions

The ITU G.709 and ITU-T G.8021 section monitoring trunk-side PM parameters are shown in the following table. For more information, see the "Transponder, Muxponder, Xponder, ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE Card Performance Monitoring , on page 10" section.

Table 31: ITU G.709 and ITU-T G.8021 Section Monitoring PM Definitions

Parameter	Definition
BBE-SM	Section Monitoring Background Block Errors (BBE-SM) shows the number of background block errors recorded in the OTN section during the PM time interval.
BBER-SM	Section Monitoring Background Block Errors Ratio (BBER-SM) shows the background block errors ratio recorded in the OTN path during the PM time interval.
ES-SM	Section Monitoring Errored Seconds (ES-SM) shows the errored seconds recorded in the OTN section during the PM time interval.
ESR-SM	Section Monitoring Errored Seconds Ratio (ESR-SM) shows the severely errored seconds ratio recorded in the OTN section during the PM time interval.
FC-SM	Section Monitoring Failure Counts (FC-SM) shows the failure counts recorded in the OTN section during the PM time interval.
SES-SM	Section Monitoring Severely Errored Seconds (SES-SM) shows the severely errored seconds recorded in the OTN section during the PM time interval.
SESR-SM	Section Monitoring Severely Errored Seconds Ratio (SESR-SM) shows the severely errored seconds ratio recorded in the OTN section during the PM time interval.
UAS-SM	Section Monitoring Unavailable Seconds (UAS-SM) shows the unavailable seconds recorded in the OTN section during the PM time interval.

The ITU G.709 path monitoring trunk-side PM parameters are shown in the following table. For more information, see the "Transponder, Muxponder, Xponder, ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE Card Performance Monitoring , on page 10" section.

Table 32: ITU G.709 Path Monitoring PM Definitions

Parameter	Definition
BBE-PM	Path Monitoring Background Block Errors (BBE-PM) shows the number of background block errors recorded in the OTN path during the PM time interval.

BBER-PM	Path Monitoring Background Block Errors Ratio (BBER-PM) shows the background block errors ratio recorded in the OTN path during the PM time interval.
ES-PM	Path Monitoring Errored Seconds (ES-PM) shows the errored seconds recorded in the OTN path during the PM time interval.
ESR-PM	Path Monitoring Errored Seconds Ratio (ESR-PM) shows the severely errored seconds ratio recorded in the OTN path during the PM time interval.
FC-PM	Path Monitoring Failure Counts (FC-PM) shows the failure counts recorded in the OTN path during the PM time interval.
SES-PM	Path Monitoring Severely Errored Seconds (SES-PM) shows the severely errored seconds recorded in the OTN path during the PM time interval.
SESR-PM	Path Monitoring Severely Errored Seconds Ratio (SESR-PM) shows the severely errored seconds ratio recorded in the OTN path during the PM time interval.
UAS-PM	Path Monitoring Unavailable Seconds (UAS-PM) shows the unavailable seconds recorded in the OTN path during the PM time interval.

Full RMON Statistics PM Parameter Definitions

The MXP_MR_2.5G, MXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 10x10G-LC, WSE, 40G-MXP-C, 40E-MXP-C, 40ME-MXP-C, 40E-TXP-C, and 40ME-TXP-C cards 40E-TXP-C and 40ME-TXP-C , and 40G-TXP-C full RMON statistics PM parameters are shown in the following table. For more information, see the "Transponder, Muxponder, Xponder, ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE Card Performance Monitoring , on page 10" section.

Table 33: Full RMON Statistics PM Definitions

Parameter	**Definition**
dot3StatsFCSErrors	The number of frames with frame check errors.
dot3StatsFrameTooLong	The number of packets at least 64 octets long, without a bad Frame Check Sequence (FCS), where the 802.3 length/type field did not match the computed DATA field length.
etherStatsBroadcastPkts	The number of broadcast packets, excluding multicast packets, that are 64-16376 octets in length, and have a valid FCS.
etherStatsCRCAlignErrors	The number of packets that are 64-1518 octets in length without an integral number of octets, or with a bad FCS.
etherStatsFragments	The number of packets less than 64 octets long that do not have an integral number of octets or that have a bad FCS.

etherStatsJabbers	The number of octets of data, including bad packets, that were received on the network.
etherStatsMulticastPkts	The number of multicast packets, excluding broadcast packets, that are 64-16376 octets in length, and have a valid FCS.
etherStatsOctets	The number in bytes of received packets, including bad packets and excluding framing bits except for FCS bytes.
etherStatsOversizePkts	The number of packets more than 16376 octets long that have a valid FCS.
etherStatsPkts64Octets	The number of packet received, including error packets, that are 64 octets in length.
etherStatsPkts65to127Octets	The number of packets received, including error packets, that are 65-127 octets in length.
etherStatsPkts128to255Octets	The number of packets received, including error packets, that are 128-255 octets in length.
etherStatsPkts256to511Octets	The number of packets received, including error packets, that are 256-511 octets in length.
etherStatsPkts512to1023Octets	The number of packets received, including error packets, that are 512-1023 octets in length.
etherStatsPkts1024to1518Octets	The number of packets received, including error packets, that are 1024-1518 octets in length.
etherStatsUndersizePkts	The number of packets less than 64 octets long that have a valid FCS.
fcStatsLinkRecoveries	The number of link recoveries.
fcStatsRxCredits	The number of current receive buffer to buffer credits.
fcStatsTxCredits	The number of current transmit buffer to buffer credits.
fcStatsZeroTxCredits	This is a count that increments when the FC/FICON Tx credits go from a nonzero value to zero.
gfpStatsLFDRaised	The number of loss of frame delineation (LFD) raised.
gfpStatsRoundTripLatencyUSe	Round trip delay for the end-to-end Fibre Channel transport in microseconds.
gfpStatsRxCRCErrors	The number of packets received with a payload FCS error.
gfpStatsRxCSFRaised	Received GFP loss of client character synchronization (LOCCS).
gfpStatsRxDistanceExtBuffers	The number of receive buffer credit for GFP-T (valid only if distance extension is enabled)
gfpStatsRxMBitErrors	The received multibit errored core header count (cHEC).

gfpStatsRxSBitErrors	The received single-bit errored cHEC.
gfpStatsRxSblkCRCErrors	The number of packets received with a payload FCS error. Sblk stands for super block in the GFP payload.
gfpStatsRxTypeInvalid	Received GFP frames with invalid type (these are discarded). For example, receiving GFP frames that contain Ethernet data when we expect Fibre Channel data.
gfpStatsTxDistanceExtBuffers	The number of transmit buffer credit for GFP-T (valid only if distance extension is enabled).
ifInUcastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were not addressed to a multicast or broadcast address at this sub-layer. **Note** This counter does not increment for traffic with packet size more than 64 bytes on the 10x10G-LC card configured in the RGN-10G mode.
ifInMulticastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses. **Note** This counter does not increment for traffic with packet size more than 64 bytes on the 10x10G-LC card configured in the RGN-10G mode.
ifInBroadcastPkts	The number of packets delivered to a higher sublayer and addressed to a broadcast address at this sublayer. **Note** This counter does not increment for traffic with packet size more than 64 bytes on the 10x10G-LC card configured in the RGN-10G mode.
ifInDiscards	The number of inbound packets that were chosen to be discarded even though no errors were detected, to prevent them from being deliverable to a higher-layer protocol. One possible reason for discarding such a packet could be to free buffer space.
ifInErrors	The number of inbound packets (or transmission units) that contained errors preventing them from being delivered to a higher-layer protocol.
ifInErrorBytePkts	The number of received packets with an error symbol detected.
ifInFramingErrorPkts	The number of received packets with a control symbol other than an error detected.
ifInJunkInterPkts	The number of interpacket gaps between valid start symbols during which a symbol other than idle is detected, including packets of length 1-8 octets.

ifInMulticastPkts	The total number of multicast frames received error-free.
ifInOctets	The number of bytes received since the last counter reset.
ifOutBroadcastPkts	The number of packets requested by higher-level protocols and addressed to a broadcast address at this sublayer, including those not transmitted.
ifOutDiscards	The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free buffer space.
ifOutMulticastPkts	The number of multicast frames transmitted error-free.
ifOutOctets	The number of bytes transmitted since the last counter reset.
InvalidCRCError	A count of invalid cyclic redundancy checks (CRCs).
mediaIndStatsRxFramesBadCRC	The number of received frames with a CRC error.
mediaIndStatsRxFramesTooLong	The number of received frames that are too long.
Running Disparity Count	A count of errors that affect the disparity of the received data stream.
rxControlFrames	The number of MAC control packets that are type 0x8808 and contain at least 64 octets in length.
rxFrames	count of the number of frames received without errors.
rxLinkReset (Only for FC Mode)	A count of the received link resets.
rxPauseFrames	The number of received 802.x paused frames.
rxTotalPkts	The number of received packets.
rxUnknownOpcodeFrames	Number of packets of at least 64 octets in length ad type 0x8808, with opcode not equal to 1.
Time Last Cleared	A time stamp indicating the last time statistics were reset.
txBytes	A count of the number of bytes transmitted from the frame since the last counter reset.
txFrames	A count of the number of transmitted frames.
txTotalPkts	The number of transmitted packets.
dot3StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3StatsFrameTooLong	A count of frames received on a particular interface that exceed the maximum permitted frame size.

dot3StatsInPauseFrames	A count of frames received on this interface with an opcode indicating the PAUSE operation.
dot3StatsOutPauseFrames	A count of MAC Control frames transmitted on this interface with an opcode indicating the PAUSE operation.
etherStatsUndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets and were otherwise well formed.
medialndStatsTxFramesTooLong	Total number of transmitted data frames that are less than 5 bytes. This value is a part of HDLC and GFP port statistics.
medialndStatsTxFramesTruncated	Number of transmitted data frames that exceed the MTU. This value is part of HDLC and GFP port statistics.
pcs49RxErrBer	Total number of 125uSec periods where BER was detected. BER is a condition where one or more errors are detected or counted on the PCS layer.
pcs49RxErrDec	Total number of invalid blocks received. 64 bits of data are transmitted as 66-bit code blocks on the PHY layer with the 64-bit/66-bit encoder/decoder. The 66-bit code block has an initial 2-bit Sync Header, that can assume only the values 01 (data only) or 10 (data or control). The block is counted as invalid if the Sync Header bits assume invalid values.
gfpStatsRxFrame	Total number of received data frames.
gfpStatsTxFrame	Total number of transmitted data frames.
gfpStatsRxOctets	Total number of GFP data octets received.
gfpStatsTxOctets	Total number of GFP data octets transmitted.
gfpRxCmfFrame	—
gfpTxCmfFrame	—

FEC PM Parameter Definitions

The MXP_MR_2.5G, MXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, 100G-LC-C, 100GS-CK-LC , 200G-CK-LC, and 100G-CK-C card FEC PM parameters are shown in the following table. For more information, see the "Transponder, Muxponder, Xponder, ADM-10G, 100G-LC-C, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, WSE, AR_MXP, AR_XP, and AR_XPE Card Performance Monitoring , on page 10" section.

Table 34: FEC PM Definitions

Parameter	**Definition**
Bit Errors	Bit Errors are the number of bit errors corrected.

FEC (NE)	FEC enables correction and detection of errors along the optical links where OTN and FEC are provisioned. FEC uses Reed Solomon code RS (255,239) encoding. The FEC field is found in Rows 1 to 4 and Columns 3835 to 4080. It will contain either the Reed-Solomon RS(255,239) codes, or if FEC is disabled, fixed stuff bytes (zeros). **Note** The FEC PM information can be found in the card view Performance > OTN PM tab. FEC must be enabled on the transponder units in order for FEC PM values to be reported.
UNC-Words	Uncorrectable Words (UNC-Words) occur when FEC detects and corrects errors to deliver a 7 to 8 dB improvement in the signal-to-noise ratio (also called margin). For ITU G.709, the FEC code used is Reed-Solomon RS (255, 239).

SONET PM Parameter Definitions

The definitions for each type of SONET PM parameter available on the ONS 15454 and NCS ANSI nodes are shown in the following table. These parameters become available when the client type is set to OC-3, OC-12, or OC-48 on a TXP_MR_2.5G or TXPP_MR_2.5G card, OC-192 on a TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or ADM-10G, or WSE, or 10x10G-LC card, or to OC-768 on a 40E-TXP-C, or 40ME-TXP-C card, or to OC768 on a 40G-TXP-C card The OC-48 client PM is available on MXP_2.5_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_MR_10DME_C, and MXP_MR_10DME_L cards. The OC-48 trunk PM is available on MXP_MR_2.5G and MXPP_MR_2.5G cards.

Table 35: SONET PM Parameters

Parameter	**Definition**
CV-L	Line Coding Violation (CV-L) indicates the number of coding violations occurring on the line. This parameter is a count of bipolar violations (BPVs) and excessive zeros (EXZs) occurring over the accumulation period.
CV-S	Section Coding Violation (CV-S) is a count of bit interleaved parity (BIP) errors detected at the section layer (that is, using the B1 byte in the incoming SONET signal). Up to eight section BIP errors can be detected per STS-N frame; each error increments the current CV-S second register.
ES-L	Line Errored Seconds (ES-L) is a count of the seconds containing one or more anomalies (BPV + EXZ) and/or defects (that is, loss of signal) on the line.
ES-S	Section Errored Seconds (ES-S) is a count of the number of seconds when at least one section-layer BIP error was detected or an SEF or loss of signal (LOS) defect was present.

FC-L	Line Failure Count (FC-L) is a count of the number of near-end line failure events. A failure event begins when an Alarm Indication Signal Line (AIS-L) failure is declared or when a lower-layer, traffic-related, near-end failure is declared. This failure event ends when the failure is cleared. A failure event that begins in one period and ends in another period is counted only in the period where it begins.
SEF-S	Severely Errored Framing Seconds (SEFS-S) is a count of the seconds when an SEF defect was present. An SEF defect is expected to be present during most seconds when an LOS or loss of frame (LOF) defect is present. However, there can be situations when the SEFS-S parameter is only incremented based on the presence of the SEF defect. **Note** The RTRV-PM-<MOD2> command does not retrieve SEFS counter for OC192/STM64 payloads on ADM-10G, 40G/40E (TXP/MXP), and OTU2-XP cards.
SES-L	Line Severely Errored Seconds (SES-L) is a count of the seconds containing more than a particular quantity of anomalies (BPV + EXZ > 44) and/or defects on the line
SES-S	Section Severely Errored Seconds (SES-S) is a count of the seconds when K (see Telcordia GR-253 for value) or more section-layer BIP errors were detected or an SEF or LOS defect was present.
UAS-L	Line Unavailable Seconds (UAS-L) is a count of the seconds when the line is unavailable. A line becomes unavailable when ten consecutive seconds occur that qualify as SES-Ls, and it continues to be unavailable until ten consecutive seconds occur that do not qualify as SES-Ls.

SDH PM Parameter Definitions

The definitions for each type of SDH PM parameter available on the ONS 15454 and NCS ETSI nodes are shown in the following table. These parameters become available when the client type is set to STM-1, STM-4, or STM-16 on a TXP_MR_2.5G or TXPP_MR_2.5G card, STM-64 on a TXP_MR_10G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, or ADM-10G, or WSE, or 10x10G-LC card, or to STM-356 on a 40E-TXP-C, or 40ME-TXP-C card, or to STM356 on a 40G-TXP-C card. The STM-16 client PM is available on MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_MR_10DME_C, and MXP_MR_10DME_L cards. The STM-16 trunk PM is available on MXP_MR_2.5G and MXPP_MR_2.5G cards.

Table 36: SDH PM Parameters

Parameter	Definition
MS-BBE	Multiplex Section Background Block Error (MS-BBE) is an errored block not occurring as part of an SES.

MS-BBER	Multiplex Section Background Block Error Ratio (MS-BBER) is the ratio of BBE to total blocks in available time during a fixed measurement interval. The count of total blocks excludes all blocks during SESs.
MS-EB	Multiplex Section Errored Block (MS-EB) indicates that one or more bits are in error within a block.
MS-ES	Multiplex Section Errored Second (MS-ES) is a one-second period with one or more errored blocks or at least one defect.
MS-ESR	Multiplex Section Errored Second Ratio (MS-ESR) is the ratio of errored seconds to total seconds in available time during a fixed measurement interval.
MS-SES	Multiplex Section Severely Errored Second (MS-SES) is a one-second period that contains 30 percent or more errored blocks or at least one defect. SES is a subset of ES. For more information, refer to ITU-T G.829 Section 5.1.3.
MS-SESR	Multiplex Section Severely Errored Second ratio (MS-SESR) is the ratio of SES to total seconds in available time during a fixed measurement interval.
MS-UAS	Multiplex Section Unavailable Seconds (MS-UAS) is a count of the seconds when the section was unavailable. A section becomes unavailable when ten consecutive seconds occur that qualify as MS-SESs, and it continues to be unavailable until ten consecutive seconds occur that do not qualify as MS-SESs. When the condition is entered, MS-SESs decrement and then count toward MS-UAS.
RS-BBE	Regenerator Section Background Block Error (RS-BBE) is an errored block not occurring as part of an SES.
RS-BBER	Regenerator Section Background Block Error Ratio (RS-BBER) is the ratio of BBE to total blocks in available time during a fixed measurement interval. The count of total blocks excludes all blocks during SESs.
RS-EB	Regenerator Section Errored Block (RS-EB) indicates that one or more bits are in error within a block.
RS-ES	Regenerator Section Errored Second (RS-ES) is a one-second period with one or more errored blocks or at least one defect.
RS-ESR	Regenerator Section Errored Second Ratio (RS-ESR) is the ratio of errored seconds to total seconds in available time during a fixed measurement interval.
RS-SES	Regenerator Section Severely Errored Second (RS-SES) is a one-second period which contains 30 percent or more errored blocks or at least one defect. SES is a subset of ES.

RS-SESR	Regenerator Section Severely Errored Second Ratio (RS-SESR) is the ratio of SES to total seconds in available time during a fixed measurement interval.
RS-UAS	Regenerator Section Unavailable Second (RS-UAS) is a count of the seconds when the regenerator section was unavailable. A section becomes unavailable when ten consecutive seconds occur that qualify as RS-UASs, and it continues to be unavailable until ten consecutive seconds occur that do not qualify as RS-UASs.

Pointer Justification Count Performance Monitoring

For the MultiService Transport Platform (MSTP), only the MXP_2.5G_10G card uses pointer justification counts. Pointers are used to compensate for frequency and phase variations. Pointer justification counts indicate timing errors on networks. When a network is out of synchronization, jitter and wander occur on the transported signal. Excessive wander can cause terminating equipment to slip.

Slips cause different effects in service. Voice service has intermittent audible clicks. Compressed voice technology has short transmission errors or dropped calls. Fax machines lose scanned lines or experience dropped calls. Digital video transmission has distorted pictures or frozen frames. Encryption service loses the encryption key, causing data to be transmitted again.

For ONS 15454 and NCS ANSI nodes, pointers provide a way to align the phase variations in STS and VT payloads. The STS payload pointer is located in the H1 and H2 bytes of the line overhead. Clocking differences are measured by the offset in bytes from the pointer to the first byte of the STS synchronous payload envelope (SPE) called the J1 byte. Clocking differences that exceed the normal range of 0 to 782 can cause data loss.

For ONS 15454 and NCSETSI nodes, pointers provide a way to align the phase variations in VC4 payloads. The VC4 payload pointer is located in the H1 and H2 bytes of the AU pointers section and is a count of the number of bytes the VC4 path overhead (POH) J1 byte is away from the H3 byte, not including the section overhead bytes. Clocking differences are measured by the offset in bytes from the pointer to the first byte of the VC4 POH called the J1 byte. Clocking differences that exceed the normal range of 0 to 782 can cause data loss.

There are positive (PPJC) and negative (NPJC) pointer justification count parameters. PPJC is a count of path-detected (PPJC-PDET-P) or path-generated (PPJC-PGEN-P) positive pointer justifications. NPJC is a count of path-detected (NPJC-PDET-P) or path-generated (NPJC-PGEN-P) negative pointer justifications depending on the specific PM name. PJCDIFF is the absolute value of the difference between the total number of detected pointer justification counts and the total number of generated pointer justification counts. PJCS-PDET-P is a count of the one-second intervals containing one or more PPJC-PDET or NPJC-PDET. PJCS-PGEN-P is a count of the one-second intervals containing one or more PPJC-PGEN or NPJC-PGEN.

A consistent pointer justification count indicates clock synchronization problems between nodes. A difference between the counts means that the node transmitting the original pointer justification has timing variations with the node detecting and transmitting this count. For ONS 15454 and NCS SONET nodes, positive pointer adjustments occur when the frame rate of the SPE is too slow in relation to the rate of the STS-1. For ONS 15454 and NCS SDH nodes, positive pointer adjustments occur when the frame rate of the path overhead (POH) is too slow in relation to the rate of the VC4.

In CTC, the count fields for PPJC and NPJC PMs appear white and blank unless they are enabled on the card view Provisioning tab.

Procedures for Monitoring Performance

Before You Begin

Before performing any of the following procedures, investigate all alarms and clear any trouble conditions. Refer to the *Cisco ONS 15454 DWDM Troubleshooting Guide* and *Cisco NCS 2000 Series Troubleshooting Guide* as necessary.

This section lists the chapter procedures (NTPs). Turn to a procedure for applicable tasks (DLPs).

1. NTP-G73 Change the PM Display—Complete as needed to change the displayed PM counts.
2. NTP-G279 Monitor TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Card Performance—Complete as needed to monitor the performance for the TNC and TNCE cards.
3. NTP-G74 Monitor DWDM Card Performance—Complete as needed to monitor performance for dense wavelength division multiplexing (DWDM) cards, which includes the OSCM, OSC-CSM, 32MUX-O, 32DMX, 32DMX-O, 32DMX-L, 40-MUX-C, 40-DMX-C, 40-DMX-CE, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 40-SMR1-C, 40-SMR2-C, 4MD-xx.x, 32WSS, 32WSS-L, TDC-CC, TDC-FC. OPT-BST, OPT-PRE, OPT-BST-L, OPT-AMP-L, OPT-AMP-17-C, OPT-RAMP-C and OPT-RAMP-CE cards.
4. NTP-G75 Monitor Transponder and Muxponder Performance—Complete as needed to monitor performance for all transponder (TXP), muxponder (MXP), Xponder (GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP), and ADM-10G cards.
5. NTP-G193 Enable or Disable AutoPM—Complete as needed to enable or disable automatic autonomous performance monitoring (AutoPM) reports.

NTP-G73 Change the PM Display

Purpose	This procedure enables you to change the appearance of PM counts by selecting drop-down list or radio button options in the Performance window.
Tools/Equipment	None
Prerequisite Procedures	Before you monitor performance, be sure you have created the appropriate circuits and provisioned the card according to your specifications. For more information, see the chapters "Create Optical Channel Circuits and Provisionable Patchcords", "Provision Transponder and Muxponder Cards", and "Change DWDM Card Settings" in the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 Complete the "DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI at the node that you want to monitor. If your are already logged in, continue with Step 2.

Step 2 As needed, use the following tasks to change the display of PM counts:

- DLP-G131 Refresh PM Counts at 15-Minute Intervals , on page 47
- DLP-G132 Refresh PM Counts at One-Day Intervals, on page 48
- DLP-G133 View Near-End PM Counts, on page 49
- DLP-G134 View Far-End PM Counts, on page 50
- DLP-G135 Reset Current PM Counts, on page 51
- DLP-G136 Clear Selected PM Counts, on page 51
- DLP-G410 Clear All PM Thresholds, on page 53
- DLP-G137 Set the Auto-Refresh Interval for Displayed PM Counts, on page 53
- DLP-G138 Refresh PM Counts for a Different Port, on page 54

Stop. You have completed this procedure.

DLP-G131 Refresh PM Counts at 15-Minute Intervals

Purpose	This task changes the window view to display PM counts in 15-minute intervals.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to change the PM count display interval. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to change the PM interval to 15 minutes for a subtab, click the relevant subtab(s), located on the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to change the PM interval to 15 minutes for a specific port, select the port from the Ports drop-down list (where available).

Step 5 To go to any of the tabs, subtabs, or ports (found in the Ports drop-down list where available) for the card where you want to set the PM count interval, click the subtab and choose the port, if applicable from the drop-down list.

Step 6 Click the **15 min** radio button.

Step 7 Click **Refresh** . PM parameters appear in 15-minute intervals synchronized with the time of day.

Step 8 View the Curr column to find PM counts for the current 15-minute interval.

Each monitored performance parameter has corresponding threshold values for the current time period. If the value of the counter exceeds the threshold value for a particular 15-minute interval, a threshold crossing alert (TCA) is raised. The number represents the counter value for each specific PM parameter.

Step 9 View the Prev-*n* columns to find PM counts for the previous 15-minute intervals.

Note If a complete 15-minute interval count is not possible, the value appears with a yellow background. An incomplete or incorrect count can be caused by monitoring for less than 15 minutes after the counter started, changing the node timing settings, changing the time zone settings, replacing a card, resetting a card, or changing port service states. When the problem is corrected, the subsequent 15-minute interval appears with a white background.

Step 10 Return to your originating procedure (NTP).

DLP-G132 Refresh PM Counts at One-Day Intervals

Purpose	This task changes the window view to display PM parameters in 1-day intervals.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to change the PM interval. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to refresh the PM counts for a subtab, click the relevant subtab(s), located along the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to refresh the PM counts for a specific port, select the port from the Ports drop-down list (where available).

Step 5 Click the **1 day** radio button.

Step 6 Click **Refresh**. Performance monitoring appears in 1-day intervals synchronized with the time of day.

Step 7 View the Curr column to find PM counts for the current 1-day interval.

Each monitored performance parameter has corresponding threshold values for the current time period. If the value of the counter exceeds the threshold value for a particular 1-day interval, a TCA is raised. The number represents the counter value for each specific PM parameter.

Step 8 View the Prev-*n* columns to find PM counts for the previous 1-day intervals.

Note If a complete count over a 1-day interval is not possible, the value appears with a yellow background. An incomplete or incorrect count can be caused by monitoring for less than 24 hours after the counter started, changing node timing settings, changing the time zone settings, replacing a card, resetting a card, or changing port service states. When the problem is corrected, the subsequent 1-day interval appears with a white background.

Step 9 Return to your originating procedure (NTP).

DLP-G133 View Near-End PM Counts

Purpose	This task enables you to view near-end PM counts for the selected card and port.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to view near end PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to view the near-end PM counts for a subtab, click the relevant subtab(s), located on the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to view near-end PM counts for a specific port, select the port from the Ports drop-down list (where available).

Step 5 Click the **Near End** radio button, where available. (Viewing near-end PM counts is not available on some tabs.)

Step 6 Click **Refresh**. All current PM parameters for the selected card on the incoming signal appear.

Step 7 View the Curr column to find PM counts for the current time interval.

Step 8 View the Prev-*n* columns to find PM counts for the previous time intervals.

Step 9 Return to your originating procedure (NTP).

DLP-G134 View Far-End PM Counts

Purpose	This task enables you to view far-end PM parameters for the selected card and port.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note Far-end PM parameters are not available for al ports.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to view far-end PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to view far-end PM counts for a subtab, click the relevant subtab(s), located along the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to view far-end PM counts for a specific port, select the port from the Ports drop-down list (where available).

Step 5 Click the **Far End** radio button, where available. (Viewing far-end PM counts is not available on some tabs.)

Step 6 Click **Refresh**. All PM parameters recorded by the far-end node for the selected card on the outgoing signal appear.

Step 7 View the Curr column to find PM counts for the current time interval.

Step 8 View the Prev-*n* columns to find PM counts for the previous time intervals.

Step 9 Return to your originating procedure (NTP).

DLP-G135 Reset Current PM Counts

Purpose	This task clears the current PM count, but it does not clear the cumulative PM count. This task allows you to see how quickly PM counts rise.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to reset the current PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to reset the PM counts for a subtab, click the relevant subtab(s), located along the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to reset the PM counts for a specific port, select the port from the Ports drop-down list (where available).

Note For all TXP and MXP cards and the GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP card, you cannot change the PM count interval on the Optics PM > Current Values tab.

Step 5 Click **Baseline**.

Note The Baseline button clears the PM counts that appear in the current time interval but does not clear the PM counts on the card. When the current time interval expires or the window view changes, the total number of PM counts on the card and in the window appears in the appropriate column. The baseline values are discarded if you change views to a different window and then return to the Performance window.

Step 6 View the current statistics columns to observe changes to PM counts for the current time interval.

Step 7 Return to your originating procedure (NTP).

DLP-G136 Clear Selected PM Counts

Purpose	This task allows you to set the values of all displayed statistics, all statistics for a port, or all statistics for all optical ports on the card to zero.
Tools/Equipment	None

Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to clear the PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to clear the selected PM counts for a subtab, click the relevant subtab(s), located along the left side of the Performance tab and click Clear.

Note Performance subtabs vary depending on the card.

Step 4 If you want to clear the selected PM counts for a specific port, select the OTN subtab or port from the Ports drop-down list (where available).

Note For all TXP and MXP cards and the GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, and OTU2_XP card, you cannot change the PM count interval on the Optics PM > Current Values tab.

Step 5 Click **Clear**.

Caution Pressing the Clear button can mask problems if used incorrectly. This button is commonly used for testing purposes. After pressing this button, the current bin is marked invalid. Also note that the unavailable seconds (UAS) count is not cleared if you were counting UAS; therefore, this count could be unreliable when you press Clear.

Step 6 From the Clear Statistics dialog box, click one of the following radio buttons:

- **Displayed statistics**: Clearing displayed statistics erases all PM counts associated with the current combination of statistics on the selected port from the card and the window. This means that the selected time interval, direction, and signal type counts are erased from the card and the window.
- **All statistics for port *x***: Clearing all statistics for port x erases all PM counts associated with all combinations of the statistics on the selected port from the card and the window. This means that all time intervals, directions, and signal type counts are erased from the card and the window.
- **All statistics on card**: Clearing all statistics for card erases all PM counts for all ports from the card and the window.

Step 7 From the Clear Statistics dialog box, click **OK** to clear the selected statistics. Click **Yes** to confirm the change.

Step 8 Verify that the selected PM counts have been cleared.

Step 9 Return to your originating procedure (NTP).

DLP-G410 Clear All PM Thresholds

Purpose	This tasks clears and resets all PM thresholds to the default values.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Superuser only

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM thresholds. The card view appears.

Step 2 Click the **Provisioning** tab.

Step 3 Click the **Thresholds** subtabs. The subtab names vary depending on the card selected.

Step 4 Click **Reset to Default**.

Caution Pressing the Reset button can mask problems if used incorrectly. This button is commonly used for testing purposes.

Step 5 Click **Yes** in the Reset to Default dialog box.

Step 6 Verify that the PM thresholds have been reset.

Step 7 Return to your originating procedure (NTP).

DLP-G137 Set the Auto-Refresh Interval for Displayed PM Counts

Purpose	This task changes the window auto-refresh intervals for updating the PM counts.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to set the auto-refresh interval for displayed PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 If you want to set the PM auto-refresh interval for a subtab, click the relevant subtab(s), located along the left side of the Performance tab.

Note Performance subtabs vary depending on the card.

Step 4 If you want to set the PM auto-refresh interval for a specific port, select the port from the Ports drop-down list (where available).

Step 5 From the Auto-refresh drop-down list, choose one of the following options:

- **None**: This option disables the auto-refresh feature.
- **15 Seconds**: This option sets the window auto-refresh at 15-second time intervals.
- **30 Seconds**: This option sets the window auto-refresh at 30-second time intervals.
- **1 Minute**: This option sets the window auto-refresh at 1-minute time intervals.
- **3 Minutes**: This option sets the window auto-refresh at 3-minute time intervals.
- **5 Minutes:** This option sets the window auto-refresh at 5-minute time intervals.

Step 6 Click **Refresh**. The PM counts for the newly selected auto-refresh time interval appear.

Depending on the selected auto-refresh interval, the displayed PM counts automatically update when each refresh interval completes. If the auto-refresh interval is set to None, the PM counts that appear are not updated unless you click Refresh.

Step 7 Return to your originating procedure (NTP).

DLP-G138 Refresh PM Counts for a Different Port

Purpose	This task changes the window view to display PM counts for another port on a TXP and MXP cards, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, OTU2_XP, and 400G-XP-LC cards.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the DWDM, TXP, or MXP card where you want to refresh PM counts for a different port. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 In the Port drop-down list, choose a port.

Step 4 In the ODU drop-down list, choose a ODU number.

This field is available only for 400G-XP-LC cards configured in the OTNXC mode.

Step 5 Click **Refresh**. The PM counts for the newly selected port or ODU appear.

Step 6 Return to your originating procedure (NTP).

NTP-G279 Monitor TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Card Performance

Purpose	This procedure enables you to view, transmits, and receive performance information for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS ports during selected time intervals to detect possible performance problems. This procedure also enables you to set the RMON thresholds. This procedure is applicable on the Cisco ONS 15454 M2, Cisco ONS 15454 M6, Cisco NCS 2002, Cisco NCS 2006, and Cisco NCS 2015 shelves.
Tools/Equipment	None
Prerequisite Procedures	Before you monitor performance, be sure you have created the appropriate circuits and provisioned the card according to your specifications. For more information, see the chapters "Create Optical Channel Circuits and Provisionable Patchcords" and "Change DWDM Card Settings" in the *Cisco ONS 15454 DWDM Network Configuration Guide* and *Cisco NCS 2000 Series Network Configuration Guide*.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 Complete the "DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI at the node that you want to monitor performance. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks as needed:

- DLP-G607 View Optics PM Parameters for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards
- DLP-G608 View Payload PM Parameters for the TNC, TNCE, and TNCS Cards
- DLP-G686 Set the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Card RMON Thresholds for the FE/ONE_GE Ethernet Payloads

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Stop. You have completed this procedure.

DLP-G607 View Optics PM Parameters for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards

Purpose	This task enables you to view the optics PM counts on TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards to detect possible performance problems. This task is applicable on the ONS 15454 M2, ONS 15454 M6, NCS 2002, NCS 2006, and NCS 2015 shelves.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note The optics PMs for data parameters can be viewed only after creating a pluggable port module (PPM). See the "NTP-G128 Manage Pluggable Port Modules" procedure in the chapter, "Provision Transponder and Muxponder Cards" of the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide* for more information about PPMs.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the TNC ,TNCE, TNCS-2, TNCS-2O, or TNCS card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Optics PM** tabs.

Step 3 View the PM parameter names that appear in the Param column of the Current Values and Historical PM tabs. In the Historical PM tab, the PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns.

Step 4 Return to your originating procedure (NTP).

DLP-G608 View Payload PM Parameters for the TNC, TNCE, and TNCS Cards

Purpose	This task enables you to view the payload PM counts on the TNC, TNCE, and TNCS cards to detect possible performance problems. This task is applicable on the ONS 15454 M2, ONS 15454 M6, NCS 2002, NCS 2006, and NCS 2015 shelves.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Note The payload PMs for data parameters can be viewed only after creating a pluggable port module (PPM). See the "NTP-G128 Manage Pluggable Port Modules" procedure in the chapter, Provision Transponder and Muxponder Cards" of the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide* for more information about PPMs.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the TNC, TNCE, and TNCS cards where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** tabs.

Ethernet and SONET tabs appear depending on the PPMs and ports that you provisioned through the Provisioning tab.

Step 3 View the PM parameter names that appear in the Param column of the SONET tab. The PM parameter values appear in the Curr (or current), and Prev-*n* (previous) columns.

The Ethernet tab has three subtabs: Statistics, Utilization, and History. You can view the PM parameter names and current parameter values in the Statistics subtab. You can view the percentage of utilization of Tx and Rx ports in the Utilization subtab. You can view the PM parameter names and previous parameter values in the History subtab.

Step 4 Return to your originating procedure (NTP).

DLP-G686 Set the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Card RMON Thresholds for the FE/ONE_GE Ethernet Payloads

Purpose	This task sets the RMON threshold settings for TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards carrying the FE/ONE_GE payloads.

Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document. "DLP-G605 Provision PPM and Port for the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS Cards" in the *Cisco ONS 15454 Hardware Installation Guide* and *Cisco NCS 2000 Series Hardware Installation Guide*
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This task can only be performed if the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards have at least one PPM port provisioned for FE or ONE_GE payloads.

Procedure

Step 1 In node view (single-shelf mode) or shelf view (multishelf view), display the TNC, TNCE, TNCS-2, TNCS-2O, and TNCS cards where you want to set the RMON thresholds.

Step 2 Click the **Provisioning** > **RMON Thresholds** tabs.

Step 3 Click **Create**. The Create Threshold dialog box appears.

Step 4 From the Port drop-down list, choose an individual port (FE or ONE_GE), or choose **All** to provision RMON thresholds for all ports.

Step 5 From the Variable drop-down list, choose an Ethernet variable. See the following table for a list of available Ethernet RMON variables.

Table 37: TNC and TNCE cards FE and ONE_GE RMON Thresholds

Variable	Description
ifInOctets	Total number of octets received on the interface, including framing characters.
rxTotalPkts	Total number of receive packets.
ifInUcastPkts	The number of packets, delivered by this sub-layer to a higher (sub-) layer, which were not addressed to a multicast or broadcast address at this sub-layer.
ifInMulticastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a multicast address at this sub-layer. For a MAC layer protocol, this includes both Group and Functional addresses.

ifInBroadcastPkts	The number of packets, delivered by this sub-layer to a higher (sub-)layer, which were addressed to a broadcast address at this sub-layer.
iflnErrors	Number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol.
ifOutOctets	Total number of octets transmitted out of the interface, including framing characters.
txTotalPkts	Total number of transmitted packets.
ifOutUcastPkts	The number of packets transmitted by a port that are addressed to a unicast address.
ifOutMulticastPkts	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a multicast address at this sub-layer, including those that were discarded or not sent. For a MAC layer protocol, this includes both group and functional addresses.
ifOutBroadcastPkts	The total number of packets that higher-level protocols requested be transmitted, and which were addressed to a broadcast address at this sub-layer, including those that were discarded or not sent.
dot3StatsAlignmentErrors	The number of packets received by a port that have a length (excluding framing bits but including FCS) between 64 and 1522 bytes, both inclusive, and have a bad FCS with a non-integral number of bytes.
dot3StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.
dot3StatsFrameTooLong	A count of frames received on a particular interface that exceed the maximum permitted frame size.
etherStatsUndersizePkts	The total number of packets received that were less than 64 octets long (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsFragments	The total number of packets received that were less than 64 octets in length (excluding framing bits but including FCS octets) and had either a bad Frame Check Sequence (FCS) with an integral number of octets (FCS Error) or a bad FCS with a non-integral.
etherStatsPkts64Octets	The total number of packets (including bad packets) received that were 64 octets in length (excluding framing bits but including FCS octets).

etherStatsPkts65to127Octets	The total number of packets (including error packets) received that were between 65 and 127 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts128to255Octets	The total number of packets (including error packets) received that were between 128 and 255 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts256to511Octets	The total number of packets (including error packets) received that were between 256 and 511 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts512to1023Octets	The total number of packets (including error packets) received that were between 512 and 1023 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsPkts1024to1518Octets	The total number of packets (including error packets) received that were between 1024 and 1518 octets in length inclusive (excluding framing bits but including FCS octets).
etherStatsBroadcastPkts	The total number of good packets received that were directed to the broadcast address.
etherStatsMulticastPkts	The total number of good packets received that were directed to a multicast address. Note that this number does not include packets directed to the broadcast address.
etherStatsOversizePkts	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets) and were otherwise well formed.
etherStatsJabbers	The total number of packets received that were longer than 1518 octets (excluding framing bits, but including FCS octets), and were not an integral number of octets in length or had a bad FCS.
etherStatsOctets	The total number of octets of data (including those in bad packets) received on the network (excluding framing bits but including FCS octets).

Step 6 From the Alarm Type drop-down list, indicate whether the event will be triggered by the rising threshold, the falling threshold, or both the rising and falling thresholds.

Step 7 From the Sample Type drop-down list, choose either **Relative** or **Absolute**. Relative restricts the threshold to use the number of occurrences in the user-set sample period. Absolute sets the threshold to use the total number of occurrences, regardless of time period.

Step 8 Enter the appropriate number of seconds for the Sample Period in the Sample Period field.

Step 9 Enter the appropriate number of occurrences for the Rising Threshold in the Rising Threshold field.

For a rising type of alarm, the measured value must move from below the falling threshold to above the rising threshold. For example, if a network is running below a rising threshold of 1000 collisions every 15 seconds and a problem causes 1001 collisions in 15 seconds, the excess occurrences trigger an alarm.

Step 10 Enter the appropriate number of occurrences in the Falling Threshold field. In most cases a falling threshold is set lower than the rising threshold.

A falling threshold is the counterpart to a rising threshold. When the number of occurrences is above the rising threshold and then drops below a falling threshold, it resets the rising threshold. For example, when the network problem that caused 1001 collisions in 15 seconds subsides and creates only 799 collisions in 15 seconds, occurrences fall below a falling threshold of 800 collisions. This resets the rising threshold so that if network collisions again spike over a 1000 per 15-second period, an event again triggers when the rising threshold is crossed. An event is triggered only the first time a rising threshold is exceeded (otherwise, a single network problem might cause a rising threshold to be exceeded multiple times and cause a flood of events).

Step 11 Click **OK**.

Step 12 To view all the RMON thresholds, click **Show All RMON thresholds**.

Step 13 Return to your originating procedure (NTP).

NTP-G74 Monitor DWDM Card Performance

Purpose	This procedure enables you to view, transmit, and receive performance information for OSCM, OSC-CSM, 32MUX-O, 32DMX, 32DMX-O, 32DMX-L, 40-MUX-C, 40-DMX-C, 40-DMX-CE, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 4MD-xx.x, 32WSS, 32WSS-L, 40-SMR1-C, 40-SMR2-C, TDC-CC, TDC-FC, OPT-BST, OPT-PRE, OPT-BST-L, OPT-AMP-C, OPT-AMP-L, OPT-AMP-17-C, OPT-RAMP-C, OPT-RAMP-CE, OPT-EDFA-17, OPT-EDFA-24 and OPT-EDFA-35 cards and ports during selected time intervals to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	Before you monitor performance, be sure you have created the appropriate circuits and provisioned the card according to your specifications. For more information, see the chapters "Create Optical Channel Circuits and Provisionable Patchcords" and "Change DWDM Card Settings" in the *Cisco ONS 15454 DWDM Network Configuration Guide* and *Cisco NCS 2000 Series Network Configuration Guide*.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 Complete the "DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI at the node that you want to monitor. If you are already logged in, continue with Step 2.

Step 2 Complete the following tasks as needed:

- DLP-G139 View PM Parameters for OSCM and OSC-CSM cards
- DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, 40-SMR2-C,17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS/SMR20 FS CV Cards
- DLP-G141 View Optical Power Statistics for 32MUX-O, 32WSS, 32WSS-L, 32DMX-O, 32DMX, 32DMX-L, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS/SMR20 FS CV, 40-MUX-C, 40-DMX-C, and 40-DMX-CE Cards
- DLP-G479 View Optical Power Statistics for the PSM, 12-AD-FS, and 16-AD-FS Cards
- DLP-G276 View Optical Power Statistics for 4MD-xx.x Cards
- DLP-G525 View Optical Power Statistics for TDC-CC and TDC-FC cards
- DLP-G475 View the PM Parameters for All Facilities

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Stop. You have completed this procedure.

DLP-G139 View PM Parameters for OSCM and OSC-CSM cards

Purpose	This task enables you to view optical service channel (OSC) PM counts at selected time intervals on optical service channel cards and ports (OSCM or OSC-CSM) to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the OSCM or OSC-CSM card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **OC3 Line** tabs.

Step 3 Click **Refresh**. PMs appear for the OC3 (Port 1).

Step 4 Click te **Optical Line** tab.

Step 5 In the Port drop-down list, choose the optical line port where you want to view the power statistics:

- 2—COM RX
- 3—COM TX
- 4—LINE RX (available only on the OSC-CSM card)
- 5—LINE TX (available only on the OSC-CSM card)
- 6—OSC RX (available only on the OSC-CSM card)
- 7—OSC TX (available only on the OSC-CSM card)

Step 6 Click **Refresh**. The minimum, maximum, and average optical power statistics for the selected line port appear.

Step 7 Return to your originating procedure (NTP).

DLP-G140 View Power Statistics for Optical Amplifier, 40-SMR1-C, 40-SMR2-C,17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS/SMR20 FS CV Cards

Purpose	This task enables you to view the power statistics of optical amplifiers (OPT-PRE, OPT-BST, OPT-BST-L, OPT-AMP-L, OPT-AMP-C, OPT-AMP-17-C, OPT-RAMP-C, OPT-RAMP-CE, OPT-EDFA-17, OPT-EDFA-24, OPT-EDFA-35, EDRA-1-26, EDRA-1-35, EDRA-2-26, or EDRA-2-35), 40-SMR1-C, 40-SMR2-C, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, and SMR20 FS/SMR20 FS CV Cards.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As Needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Optical Line** tab.

Step 3 In the Port drop-down list, choose an optical line port where you want to view the optical power statistics:

- For the OPT-PRE card, the following ports are available to view:
  - 1—COM RX
  - 3—DC RX
  - 4—DC TX

- For the OPT-BST and OPT-BST-E cards, the following ports are available to view:
  - 1—COM RX
  - 2—COM TX
  - 4—OSC TX
- For the OPT-BST-L card, the following ports are available to view:
  - 1—COM RX
  - 2—COM TX
  - 4—OSC TX
- For the OPT-AMP-L card, the following ports are available to view:
  - 1—COM RX
  - 2—COM TX
  - 4—OSC TX
  - 7—DC RX
  - 8—DC TX
- For the OPT-AMP-17-C card, the following ports are available to view:
  - 1—COM RX
  - 2—COM TX
  - 3—COM RX
  - 4—OSC TX
- For the OPT-RAMP-C card, the following ports are available to view:
  - 1—COM RX
  - 2—COM TX
  - 3—OSC RX
  - 4—OSC TX
  - 5—LINE-RX
  - 6—LINE-TX
  - 7—DC-RX
  - 9—RAMAN RX
  - 10—RAMAN TX
- For the OPT-RAMP-CE card, the following ports are available to view:
  - 1—COM RX

- 2—COM TX
- 3—OSC RX
- 4—OSC TX
- 5—LINE-RX
- 6—LINE-TX
- 7—DC-RX
- 9—RAMAN RX
- 10—RAMAN TX

- For the OPT-EDFA-17, and OPT-EDFA-24 cards, the following ports are available to view:
  - 1—COM-RX
  - 2—COM-TX
  - 3—OSC-RX
  - 4—OSC-TX
  - 5—LINE-RX

- For the OPT-EDFA-35 card, the following ports are available to view:
  - 1—LINE-1-RX
  - 2—LINE-1-TX
  - 3—OSC-1-RX
  - 4—OSC-1-TX
  - 5—LINE-2-RX
  - 6—LINE-2-TX
  - 7—OSC-2-RX
  - 8—OSC-2-TX

- For the EDRA-1-26, EDRA-1-35, EDRA-2-26, and EDRA-2-35 cards, the following ports are available to view:
  - 1—COM-RX
  - 6—LINE-RX
  - 7—RAMAN-RX

- For the 40-SMR1-C card, the following ports are available to view:
  - 1—EXP-RX
  - 3—DC-RX
  - 4—DC-TX

- 5—OSC-RX
- 6—OSC-TX
- 7—ADD-RX
- 8—DROP-TX
- 9—LINE-RX
- 10—LINE-TX

- For the 40-SMR2-C card, the following ports are available to view:
  - 1—DC-RX
  - 2—DC-TX
  - 3—OSC-RX
  - 4—OSC-TX
  - 5—ADD-RX
  - 6—DROP-TX
  - 7—LINE-RX
  - 10—EXP-RX 1-2
  - 11—EXP-RX 1-3
  - 12—EXP-RX 1-4

- For the 17 SMR9 FS, 24 SMR9 FS, and 34 SMR9 FS cards, the following ports are available to view:
  - OSC-TX
  - OSC-RX
  - COM-TX
  - LINE-RX
  - EXP-TX*i-j* (where *i* = 1 to 2 and *j*= 1, 3, 5, or 7)
  - EXP-RX*i-j* (where *i* = 1 to 2 and *j*= 2, 4, 6, or 8)
  - (EXP-TX 9)
  - (EXP-RX 9)
  - (EXP-TX 10)

- For the SMR20 FS/SMR20 FS CV card, the following ports are available to view:
  - OSC-TX
  - OSC-RX
  - COM-TX

- LINE-RX
- EXP-TX*i-j* (where *i* = 1 to 2 and *j*= 1 to 8)
- EXP-RX*i-j* (where *i* = 1 to 2 and *j*= 9 to 16)
- EXP-TX*i-j* (where *i* = 3 and *j*= 1 to 4)
- EXP-RX*i-j* (where *i* = 3 and *j*= 9 to 12)

Step 4 Click **Refresh**. Optical power statistics for the selected port appear.

Step 5 Click the **Opt. Ampli. Line** tab.

Step 6 Click **Refresh**. Optical power statistics for the optical amplifier output port appear:

- 2 (COM-TX), OPT-PRE card
- 6 (LINE-TX), OPT-BST card
- 6 (LINE-TX), OPT-AMP-17-C card
- 8 (DC-TX), OPT-RAMP-C card
- 8 (DC-TX), OPT-RAMP-CE card
- 6 (LINE-TX), OPT-EDFA-17, OPT-EDFA-24 and OPT-EDFA-35 cards
- 2 (COM-TX), 6 (LINE-RX), EDRA-1-26, EDRA-1-35, EDRA-2-26, and EDRA-2-35 cards
- 2 (EXP-TX), 40-SMR1-C card
- 8 (LINE-TX), 9 (EXP-TX 1-1), 40-SMR2-C card
- (LINE-TX), (COM-RX), 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, or SMR20 FS/SMR20 FS CV cards.

Step 7 Click the **OCH** tab. In the Port drop-down list, choose an OCH port and in the CircuitName/CircuitLabel drop-down list, choose a circuit where you want to view the optical power statistics:

- For the 40-SMR1-C card, the following ports are available to view:
  - 1—EXP-RX
  - 2—EXP-TX
  - 7—ADD-RX
  - 8—DROP-TX
  - 10—LINE-TX
- For the 40-SMR2-C card, the following ports are available to view:
  - 5—ADD-RX
  - 6—DROP-TX
  - 8—LINE-TX
  - 9—EXP-TX 1-1
  - 10—EXP-RX 1-2

- 11—EXP-RX 1-3
- 12—EXP-RX 1-4

- For the 17 SMR9 FS, 24 SMR9 FS, or 34 SMR9 FS cards, the following ports are available to view:
  - COM-TX
  - COM-RX
  - EXP-TX*i-j* (where *i* = 1 to 2 and *j*= 1, 3, 5, or 7)
  - EXP-RX*i-j* (where *i* = 1 to 2 and *j*= 2, 4, 6, or 8)
  - (EXP-TX 9)
  - (EXP-RX 9)

- For the SMR20 FS/SMR20 FS CV card, the following ports are available to view:
  - COM-TX
  - COM-RX
  - EXP-TX*i-j* (where *i* = 1 to 2 and *j*= 1 to 8)
  - EXP-RX*i-j* (where *i* = 1 to 2 and *j*= 9 to 16)
  - EXP-TX*i-j* (where *i* = 3 and *j*= 1 to 4)
  - EXP-RX*i-j* (where *i* = 3 and *j*= 9 to 12)

Step 8 Click **Refresh**. The OCH power statistics (minimum, maximum, average) for the selected port appear.

Note For the 40-SMR1-C and 40-SMR1-C cards, the OCH power statistics are reported only for those ports that are part of a circuit.

Step 9 Click the **Opt. Raman. Line** tab (applicable only for optical amplifier, 40-SMR1-C, and 40-SMR2-C cards). Optical power statistics for the optical amplifier output port appear:

- 10 (RAMAN-TX), OPT-RAMP-C card
- 10 (RAMAN-TX), OPT-RAMP-C card
- 9(PUMP-TX1), 10(PUMP-TX2), 11(PUMP-TX3), 12(PUMP-TX4), EDRA-1-26, EDRA-1-35, EDRA-2-26, and EDRA-2-35 cards

Step 10 Return to your originating procedure (NTP).

DLP-G141 View Optical Power Statistics for 32MUX-O, 32WSS, 32WSS-L, 32DMX-O, 32DMX, 32DMX-L, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS/SMR20 FS CV, 40-MUX-C, 40-DMX-C, and 40-DMX-CE Cards

Purpose	This task enables you to view optical power statistics for a 32MUX-O, 32WSS, 32WSS-L, 32DMX-O, 32DMX, 32DMX-L, 40-WSS-C, 40-WSS-CE, 40-WXC-C, 80-WXC-C, 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS/SMR20 FS CV, 40-MUX-C, 40-DMX-C, or 40-DMX-CE card.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Optical Chn** tabs.

Step 3 In the Port drop-down list, select the port where you want to view the optical power statistics.

- 32MUX-O—optical channel receive port (CHAN RX), Ports 01 through 32.
- 40-MUX-C—optical channel receive port (CHAN RX), Ports 01 through 40.
- 32WSS and 32WSS-L—optical channel receive port (ADD RX) Ports 01 through 32, or a pass-through port (PT), Ports 33 through 64.
- 32DMX-O, 32DMX, and 32DMX-L—optical channel transmit port (CHAN TX), Ports 01 through 32.
- 40-DMX-C/40-DMX-CE—optical channel transmit port (CHAN TX), Ports 01 through 40.
- 40-WSS-C/40-WSS-CE—optical add receive port (ADD RX), Ports 01 through 40, or a pass-through port (PT), Ports 41 through 80

Step 4 Click **Refresh** . Optical channel power statistics (minimum, maximum, average) for the selected port appear.

Step 5 Click the **Optical Line** tab.

Step 6 Select the port where you want to view the optical power statistics, in the Port drop-down list.

- 32WSS and 32WSS-L - Port 65, 66, 67, 68 or 69.
- 32DMX-L or 32DMX-O - accept the default port (33).
- 40-WXC-C and 40-WXC-CE - Port 10, 11, 12, or 13.

- 80-WXC-C - Ports 1 through 13 (BIDIRECTIONAL mode), ports 1 through 10 (MULTIPLEXER or DEMULTIPLEXER mode).
- 16-WXC-FS, 17 SMR9 FS, 24 SMR9 FS, 34 SMR9 FS, SMR20 FS/SMR20 FS CV - COM-RX, COM TX, EXP-RX, EXP TX, UPG-TX, UPG-RX.
- 40-WSS-C and 40-WSS-CE - Port 81, 82, 83, 84, or 85.
- 40-DMX-C and 40-DMX-CE - accept the default port (41).

Step 7 Click **Refresh**. Optical channel power statistics (minimum, maximum, average) for the selected port appear.

Step 8 Return to your originating procedure (NTP).

Note To view the optical side graphs of DWDM cards, see the section "Power Side Monitoring" in the chapter, "Network Reference" of the *Cisco ONS 15454 DWDM Network Configuration Guide* and *Cisco NCS 2000 Series Network Configuration Guide*.

DLP-G479 View Optical Power Statistics for the PSM, 12-AD-FS, and 16-AD-FS Cards

Purpose	This task enables you to view optical power statistics for a PSM, 12-AD-FS, and 16-AD-FS cards.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the PSM, 12-AD-FS, or 16-AD-FS card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Optical Line** tabs.

Step 3 In the Port drop-down list, select the port where you want to view the optical power statistics.

- For the PSM card, the following ports are available to view:
  - 1—W RX
  - 2—W TX
  - 3—P RX
  - 4—P TX
  - 5—COM RX

- 6—COM TX

- For the 12-AD-FS card, the following ports are available to view:
  - DEG1-4#1-RX 1-*i* (where *i* = 2, 4, 6, or 8)
  - DEG1-4#1-TX 1-*i* (where *i* = 1, 3, 5, or 7)
  - DEG1-4#2-RX 3-*i* (where *i* = 2, 4, 6, or 8)
  - DEG1-4#2-TX 3-*i* (where *i* = 1, 3, 5, or 7)
  - DEG1-4#3-RX 5-*i* (where *i* = 2, 4, 6, or 8)
  - DEG1-4#3-TX 5-*i* (where *i* = 1, 3, 5, or 7)
  - CH1-4#1-RX 2-*i* (where *i* = 2, 4, 6, or 8)
  - CH1-4#1-TX 2-*i* (where *i* = 1, 3, 5, or 7)
  - CH1-4#2-RX 4-*i* (where *i* = 2, 4, 6, or 8)
  - CH1-4#2-TX 4-*i* (where *i* = 1, 3, 5, or 7)
  - CH1-4#3-RX 6-*i* (where *i* = 2, 4, 6, or 8)
  - CH1-4#3-TX 6-*i* (where *i* = 1, 3, 5, or 7)

- For the 16-AD-FS card, the following ports are available to view:
  - DEG1-4-RX 1-*i* (where *i* = 2, 4, 6, or 8)
  - DEG1-4-TX 1-*i* (where *i* = 1, 3, 5, or 7)
  - UPG#1-RX 2-*i* (where *i* = 9 to 16)
  - UPG#1-TX 2-*i* (where *i* = 1 to 8)
  - UPG#2-RX 3-*i* (where *i* = 9 to 16)
  - UPG#2-TX 3-*i* (where *i* = 1 to 8)
  - CH1-8/UPG#1-RX 4-*i* (where *i* = 9 to 16)
  - CH1-8/UPG#1-TX 4-*i* (where *i* = 1 to 8)
  - CH9-16/UPG#2-RX 5-*i* (where *i* = 9 to 16)
  - CH9-16/UPG#2-TX 5-*i* (where *i* = 1 to 8)

Step 4 Click **Refresh** . Optical channel power statistics (minimum, maximum, average) for the selected port appear.

Step 5 To change the auto-refresh interval, click **Auto Refresh** and choose one of the automatic refresh intervals: None, 15 seconds, 30 seconds, 1 minute, 3 minutes, or 5 minutes.

Step 6 Return to your originating procedure (NTP).

DLP-G276 View Optical Power Statistics for 4MD-xx.x Cards

Purpose	This task enables you to view the minimum, maximum, and average optical power statistics for a 4MD-xx.x card channel and band ports.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the 4MD-xx.x card where you want to view the optical power statistics. The card view appears.

Step 2 Click the **Performance** > **Optical Chn** tabs.

Step 3 In the Port drop-down list, choose the channel port where you want to view the power statistics (port 1 through 8 for CHAN Ports 01 through 08).

Step 4 Click **Refresh** . The minimum, maximum, and average optical power for the selected channel port appear.

Step 5 To change the auto-refresh interval, click **Auto Refresh** and choose one of the automatic refresh intervals: None, 15 seconds, 30 seconds, 1 minute, 3 minutes, or 5 minutes.

Step 6 Click the **Optical Band** tab.

Step 7 In the Port drop-down list, choose the band port where you want to view the power statistics (band port 9 or 10 for COM Ports 09 and 10).

Step 8 Click **Refresh** . The minimum, maximum, and average optical power for the selected band port appear.

Step 9 To change the auto-refresh interval, click **Auto Refresh** and choose one of the automatic refresh intervals: None, 15 seconds, 30 seconds, 1 minute, 3 minutes, or 5 minutes.

Step 10 Return to your originating procedure (NTP).

DLP-G525 View Optical Power Statistics for TDC-CC and TDC-FC cards

Purpose	This task enables you to view optical power statistics for the TDC-CC and TDC-FC cards.
Tool/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the TDC-CC or TDC-FC card where you want to view PM counts. The card view appears

Step 2 Click the **Optical Line** tab.

Step 3 Select the port where you want to view the optical power statistics, in the Port drop-down list.

Step 4 Click **Refresh** . Optical channel power statistics (minimum, maximum, average) for the selected port appear

Step 5 Return to your originating procedure (NTP).

DLP-G475 View the PM Parameters for All Facilities

Purpose	This task enables you to view the admin state, service state and power level for all facilities on DWDM cards to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), click **Maintenance** > **DWDM** > **All Facilities** tabs.

Step 2 View the admin states, service states and power levels for all the facilities.

Step 3 Use the Mark button to selectively mark or unmark facilities. The marked facilities can be sorted on the Marked column. Sorting helps to group all the marked facilities in the table.

Step 4 Return to your originating procedure (NTP).

NTP-G75 Monitor Transponder and Muxponder Performance

Purpose	This procedure enables you to view the node near-end or far-end performance during selected time intervals on a TXP, MXP, Xponder (GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, and OTU2_XP), ADM-10G, 100G-LC-C, 100GS-CK-LC, 10x10G-LC, 200G-CK-LC, 400G-XP-LC, MR-MXP, CFP-LC, WSE, AR_MXP, AR_XP, or AR_XPE card to detect possible performance problems. Transponder cards include the TXP_MR_10G, TXP_MR_10E, TXP_MR_10EX_C, TXP_MR_2.5G, TXPP_MR_2.5G, TXP_MR_10E_C, TXP_MR_10E_L, 40E-TXP-C and 40ME-TXP-C, and 40G-TXP-C. Muxponder cards include the MXP_MR_2.5G, MXPP_MR_2.5G, MXP_MR_10DMEX_C, MXP_MR_10DME_C., MXP_MR_10DME_L, MXP_2.5G_10G, MXP_2.5G_10E, MXP_2.5G_10EX_C, MXP_2.5G_10E_C, MXP_2.5G_10E_L, 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C.
Tools/Equipment	None
Prerequisite Procedures	Before you monitor performance, be sure you have created the appropriate circuits and provisioned the card according to your specifications. For more information, see the chapters "Create Optical Channel Circuits and Provisionable Patchcords", "Provision Transponder and Muxponder Cards", and "Change DWDM Card Settings" in the *Cisco ONS 15454 DWDM Network Configuration Guide* and *Cisco NCS 2000 Series Network Configuration Guide*.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 Complete the "DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI at the node that you want to monitor performance. If you are already logged in, continue with Step 2.

Note To view optical transport network (OTN) PMs, the OTN parameters must be enabled. For more information, see the chapter, "Provision Transponder and Muxponder Cards" in the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.

Step 2 Complete the following tasks as needed to view PM parameters:

- DLP-G390 View Ethernet Statistic PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards
- DLP-G391 View Ethernet Utilization PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

- DLP-G392 View Ethernet History PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards
- DLP-G393 Refresh Ethernet PM Counts at a Different Time Interval for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards
- DLP-G146 View Optics PM Parameters
- DLP-G147 View Payload PM Parameters
- DLP-G148 View OTN PM Parameters
- DLP-G814 View ODU PM Parameters, on page 82
- DLP-G149 View Payload Statistics PM Parameters
- DLP-G150 View Payload Utilization PM Parameters
- DLP-G151 View Payload History PM Parameters
- DLP-G152 View Payload SONET/SDH PM Parameters
- DLP-G756 View Encryption PM Parameters, on page 86

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Stop. You have completed this procedure.

DLP-G390 View Ethernet Statistic PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

Purpose	This task enables you to view current statistical PM counts on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and ports to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to view the Ethernet statistics. The card view appears.

Step 2 Click the **Performance** > **Ether Ports** > **Statistics** tabs.

Step 3 Click **Refresh** . Performance monitoring statistics for each port on the card appear.

Step 4 View the PM parameter names appear in the Param column. The current PM parameter values appear in the Port # columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 5 Return to your originating procedure (NTP).

DLP-G391 View Ethernet Utilization PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

Purpose	This task enables you to view line utilization PM counts on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and ports to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view, double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to view the Ethernet utilization. The card view appears.

Step 2 Click the **Performance** > **Ether Ports > Utilization** tabs.

Step 3 Click **Refresh** . The utilization percentages for each port on the card appear.

Step 4 View the Port # column to find the port you want to monitor.

The transmit (Tx) and receive (Rx) bandwidth utilization values for the previous time intervals appear in the Prev-n columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 5 Return to your originating procedure (NTP).

DLP-G392 View Ethernet History PM Parameters for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

Purpose	This task enables you to view historical PM counts at selected time intervals on GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards and ports to detect possible performance problems.

Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE card where you want to view the Ethernet history PM data. The card view appears.

Step 2 Click the **Performance** > **Ether Ports** > **History** tabs.

Step 3 Click **Refresh** . Performance monitoring statistics for each port on the card appear.

Step 4 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Prev-*n* columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 5 Return to your originating procedure (NTP).

DLP-G393 Refresh Ethernet PM Counts at a Different Time Interval for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE Cards

Purpose	This task changes the window view to display specified PM counts in time intervals depending on the interval option selected for GE_XP, 10GE_XP, GE_XPE, and 10GE_XPE cards.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the GE_XP, 10GE_XP, GE_XPE, or 10GE_XPE card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** tab.

Step 3 Click the **Ether Ports** > **Utilization** or the **Ether Ports** > **History** tabs.

Step 4 From the Interval drop-down list, choose one of four options:

- **1 min** : This option shows the specified PM counts in one-minute time intervals.
- **15 min** : This option shows the specified PM counts in 15-minute time intervals.
- **1 hour** : This option shows the specified PM counts in one-hour time intervals.
- **1 day** : This option shows the specified PM counts in one-day (24 hours) time intervals.

Step 5 Click **Refresh**. The PM counts refresh with values based on the selected time interval.

Step 6 Return to your originating procedure (NTP).

DLP-G146 View Optics PM Parameters

Purpose	This task enables you to view the optics PM counts on transponder cards (TXP_MR_10G, TXP_MR_2.5G, TXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, TXP_MR_10EX_C, 40E-TXP-C, 40ME-TXP-C, 40E-TXP-C, 40ME-TXP-C40E-TXP-C, and 40ME-TXP-C, 40G-TXP-C), muxponder cards (MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_2.5G_10EX_C, MXP_MR_2.5G, MXPP_MR_2.5G, MXP_2.5G_10G, MXP_MR_10DME_C, MXP_MR_10DME_L, MXP_MR_10DMEX_C, 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C), ADM-10G, OTU2_XP, 100G-LC-C, 10x10G-LC, CFP-LC, 100G-CK-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, WSE, MR-MXP, AR_MXP, AR_XP, or AR_XPE cards to detect possible performance problems. **Note** The optics PM counts cannot be viewed on the QSFP+ ports of the MR-MXP card.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the transponder or muxponder card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Optics PM** tabs.

Step 3 View the PM parameter names that appear in the Param column of the Current Values and Historical PM tabs. In the Historical PM tab, the PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns.

Step 4 Return to your originating procedure (NTP).

DLP-G147 View Payload PM Parameters

Purpose	This task enables you to view the payload PM counts on transponder cards (TXP_MR_10G, TXP_MR_2.5G, TXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, TXP_MR_10EX_C, 40E-TXP-C, 40ME-TXP-C40E-TXP-C, and 40ME-TXP-C, 40G-TXP-C), muxponder cards (MXP_2.5G_10E, MXP_2.5G_10E_C, MXP_2.5G_10E_L, MXP_MR_2.5G, MXP_2.5G_10EX_C, MXPP_MR_2.5G, MXP_2.5G_10G, MXP_MR_10DME_C, MXP_MR_10DME_L, MXP_MR_10DMEX_C, 40G-MXP-C, 40E-MXP-C, and 40ME-MXP-C), ADM-10G, OTU2_XP, 100G-LC-C, 100GS-CK-LC, 200G-CK-LC, 400G-XP-LC, 10x10G-LC, CFP-LC, 100G-CK-C, WSE, MR-MXP, AR_MXP, AR_XP, or AR_XPE cards. **Note** The payload PM parameters of the CFP-LC card can be viewed on the virtual port of the peer 100G-LC-C card.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

The PM statistics do not properly display for the OTU2 and OC192/STM64 payloads of MR-MXP card. For example, the SES-S, SEFS-S, and ES-S parameters increment with the UAS-L parameter for OC192 payload.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the transponder or muxponder card where you want to view the payload PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** tabs.

Step 3 Go to any of the tabs, subtabs, or ports (found in the Ports drop-down list where available) for the card where you want to view the payload PM parameters by clicking on the desired subtab, and choosing the port from the Port drop-down list.

Step 4 View the PM parameter names that appear in the Param column of the SONET (or SDH), Utilization, Statistics, and History tabs. The Statistics tab displays the PM data for the specific ports. The PM parameter values appear in the Prev and Prev-*n* (previous) columns in the Utilization and History tabs.

Note The payload PMs for data parameters can be viewed only after creating a pluggable port module (PPM). For more information about PPMs, see the "NTP-G128 Manage Pluggable Port Modules" procedure in the chapter, "Provision Transponder and Muxponder Cards" of the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Configuration Guide*.

Note The PM parameters that appear depend on the data payload and framing type provisioned on the port. Unframed data payloads such as Enterprise System Connection (ESCON), DV6000, DSI/D1 video, and high-definition television (HDTV) do not provide payload PM information. The PM parameters that appear also depend on the PPM payload configured. The TXP_MR_10E card supports OC-192/STM-64, 10GE, and 10G FC payloads; the MXP_2.5G_10G and MXP_2.5G_10E cards support the OC48/STM16 payload; the MXP_MR_2.5G and MXPP_MR_2.5G cards support the 1G FC, 2G FC, 1G FICON, 2G FICON, and 1GE payloads; the ADM-10G card supports the OC-3/STM-1, OC-12/STM-4, OC-48/STM-16, 1GIGE payloads on client ports and the OC-192/STM-64 payloads on trunk ports; the OTU2_XP card supports the OC-192/STM-64, 10GE, and 10G FC payloads.

Step 5 Return to your originating procedure (NTP).

DLP-G148 View OTN PM Parameters

Purpose	This task enables you to view node near-end or far-end OTN PM parameters during selected time intervals on a TXP, MXP, or Xponder card to detect possible performance problems. Cards include: TXP_MR_10G, TXP_MR_2.5G, TXPP_MR_2.5G, TXP_MR_10E, TXP_MR_10E_C, TXP_MR_10E_L, TXP_MR_10EX_C,40E-TXP-C, 40ME-TXP-C40E-TXP-C, 40ME-TXP-C, 40G-TXP-C, MXP_MR_10DME_C, MXP_MR_10DME_L, MXP_MR_10DMEX_C, MXP_2.5G_10E, MXP_2.5G_10EX_C, MXP_MR_2.5G, MXPP_MR_2.5G, MXP_2.5G_10G, MXP_2.5G_10E_C, MXP_2.5G_10E_L, 40G-MXP-C, 40E-MXP-C, 40ME-MXP-C, GE_XP, 10GE_XP, GE_XPE, 10GE_XPE, ADM-10G, OTU2_XP, 10x10G-LC-C, 100G-LC-C, CFP-LC, 100G-CK-C, 100GS-CK-LC, 200G-CK-LC, 400G-XP-LC, WSE, MR-MXP, AR_MXP, AR_XP, and AR_XPE. **Note** The OTN PM parameters of the CFP-LC card can be viewed on the virtual port of the peer 100G-LC-C card.
Tools/Equipment	None

Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document. ITU-T G.709 and FEC must be enabled using one of the following tasks in the *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*: • DLP-G234 Change the 2.5G Multirate Transponder OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G221 Change the 10G Multirate Transponder OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G228 Change the 4x2.5G Muxponder Line OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G366 Change the 10G Data Muxponder OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G389 Change the Gigabit Ethernet Optical Transport Network Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G402 Change the ADM-10G OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G402 Change the ADM-10G OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G366 Change the AR_MXP, AR_XP, or AR_XPE OTN Settings in the chapter, "Provision Transponder and Muxponder Cards" • DLP-G722 Change the Card OTN Settings in the chapter, “Provision Transponder and Muxponder Cards”
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

The PM statistics do not properly display for the OTU2 and OC192/STM64 payloads of MR-MXP card. For example, when there is a client failure, the UAS-PM parameter displays 298 count instead of 900 count (for 15-minute intervals) for OTU2 and OC192 payloads.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the TXP or MXP card where you want to view OTN PM parameters. The card view appears.

Step 2 Click the **Performance** > **OTN PM** > **ITU-T G.709 PM** tabs.

Step 3 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns.

Step 4 Click the **FEC PM** tab.

Step 5 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns.

Step 6 Return to your originating procedure (NTP).

DLP-G814 View ODU PM Parameters

Purpose	This task enables you to view node near-end or far-end ODU trunk PM parameters during selected time intervals 400G-XP-LC card configured in the OTNXC mode.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document. ODU thresholds must be enabled using "DLP-G815 Change the 400G-XP-LC Card ODU Settings" in the chapter, "Provision Transponder and Muxponder Cards" of *Cisco ONS 15454 DWDM Line Card Configuration Guide* and *Cisco NCS 2000 Series Line Card Configuration Guide*.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the 400G-XP-LC card where you want to view ODU PM parameters. The card view appears.

Step 2 Click the **Performance** > **ODU PM** > **ODU PM** tabs.

Step 3 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns.

Step 4 If you want to view the PM counts in exponential format in a subtab, click the Exponential radio button followed by Refresh. The current and previous PM data appear in exponential format. The data format is set to Decimal by default.

Step 5 Return to your originating procedure (NTP).

DLP-G149 View Payload Statistics PM Parameters

Purpose	This task enables you to view current statistical PM counts on an MXP_MR_2.5G or MXPP_MR_2.5G, WSE, MR-MXP, CFP-LC, 100G-LC-C, 100GS-CK-LC, 200G-CK-LC, 400G-XP-LC, 10x10G-LC, or 100G-CK-C card and port to detect possible performance problems. **Note** The statistical PM counts of the CFP-LC card can be viewed on the virtual port of the peer 100G-LC-C card.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	**Security Level**

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** > **Statistics** tabs.

Step 3 Click **Refresh**. PM statistics appear for each port on the card.

Step 4 View the PM parameter names that appear in the Param column. The current PM parameter values appear in the Port # columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 5 Return to your originating procedure (NTP).

DLP-G150 View Payload Utilization PM Parameters

Purpose	This task enables you to view line utilization PM counts on an MXP_MR_2.5G or MXPP_MR_2.5G, WSE, MR-MXP, CFP-LC, 100G-LC-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, or 100G-CK-C card and port to detect possible performance problems. **Note** The utilization PM counts of the CFP-LC card can be viewed on the virtual port of the peer 100G-LC-C card.

Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** > **Utilization** tabs.

Step 3 Click **Refresh** . PM utilization values appear for each port on the card.

Step 4 View the appropriate row for the port you want to monitor.

Step 5 The transmit (Tx) and receive (Rx) bandwidth utilization values for the previous time intervals appear in the Prev-*n* columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 6 Return to your originating procedure (NTP).

DLP-G151 View Payload History PM Parameters

Purpose	This task enables you to view historical PM counts at selected time intervals on an MXP_MR_2.5G or MXPP_MR_2.5G, WSE, MR-MXP, CFP-LC, 100G-LC-C, 100GS-CK-LC , 200G-CK-LC, 400G-XP-LC, 10x10G-LC, or 100G-CK-C card and port to detect possible performance problems. **Note** The historical PM counts of the CFP-LC card can be viewed on the virtual port of the peer 100G-LC-C card.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** > **History** tabs.

Step 3 Select the desired port from the Port drop-down list.

Step 4 Click **Refresh** . PM statistics appear for the selected port.

Step 5 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Prev-*n* columns.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 6 Return to your originating procedure (NTP).

DLP-G152 View Payload SONET/SDH PM Parameters

Purpose	This task enables you to view SONET/SDH PM counts at selected time intervals on an MXP_MR_2.5G or MXPP_MR_2.5G, WSE, 10x10G-LC card and port to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multishelf mode), double-click the MXP_MR_2.5G or MXPP_MR_2.5G card where you want to view PM counts. The card view appears.

Step 2 Click the **Performance** > **Payload PM** > **SONET** or **SDH** tabs.

Step 3 Click **Refresh**. PM statistics appear for the selected port.

Step 4 View the PM parameter names that appear in the Param column. The PM parameter values appear in the Prev-*n* columns.

Note The MXP_MR_2.5G and MXPP_MR_2.5G cards support only the OC48/STM16 payload. The 10x10G-LC card supports only the OC192/STM64 payload. Each payload has a set of PM parameters.

Note To refresh, reset, or clear PM counts, see the "NTP-G73 Change the PM Display, on page 46" procedure.

Step 5 Return to your originating procedure (NTP).

DLP-G756 View Encryption PM Parameters

Purpose	This task enables you to view the Encryption PM parameters for a port of the WSE card.
Tools/Equipment	None.
Prerequisite Procedures	"DLP-G46 Log into CTC" task in the Connect the PC and Log In to the GUI document.
Required/As Needed	As needed.
Onsite/Remote	Onsite or remote.
Security Level	Security user or security super user.

Procedure

Step 1 In node view (single-shelf mode), or shelf view (multi-shelf mode), double click the WSE card for whose port you want to view the Encryption PM parameters.

Step 2 Go to **Performance** > **Encryption PM** tab.

Step 3 View the PM parameter names in the Param column. View the corresponding parameter values in the Curr (current) and Prev-*n* (previous n) columns.

Step 4 To view the PM parameters for a different port, choose the port from the **Port** drop-down list.

Step 5 To have the PM parameter values periodically refreshed after a specific time interval, choose suitably from the **Auto-refresh** drop-down list.

Step 6 Return to your originating procedure (NTP).

NTP-G349 Viewing PM Parameters for an Interface on the Cisco CRS Router

Purpose	This procedure enables you to view the PM counts on the selected interface on the Cisco CRS router to detect possible performance problems.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Retrieve or higher

Procedure

Step 1 From the View menu, choose **Go to Network View** to view the circuits for an entire network.

Step 2 Double-click the Cisco CRS router node in the circuit.

Step 3 Choose an interface on the Cisco CRS router.

Step 4 Click any one of the following subtabs to view the PM parameters of the selected interface.

Option	Description
PM > **Optics PM** tabs	To view the optics PM
PM > **FEC PM** tabs	To view the FEC PM
PM > **OTN PM** tabs	To view the OTN PM

Step 5 View the PM parameter names that appear in the Param column of the subtab. The PM parameter values appear in the Curr (current) and Prev-*n* (previous) columns

Step 6 To change the display of the PM counts, click the relevant subtab(s), located on the left side of the PM tab:

Option	Description
Intervals	If you want to change the PM interval to 1 day for a subtab, and click the **1 day** radio button followed by **Refresh**. The current and previous PM counts appear in 1-day intervals synchronized with the time of day for the selected interface. The PM interval is set to 15 min by default.
Directions	If you want to view far-end PM counts for a subtab, click the **Far End** radio button followed by **Refresh**. The current and previous PM counts recorded by the far-end side of the selected interface on the outgoing signal appear. The direction is set to Near End by default.
Data Format	If you want to view the PM counts in exponential format in a subtab, click the **Exponential** radio button followed by **Refresh**. The current and previous PM data appear in exponential format. The data format is set to Decimal by default.

Step 7 To clear all the PM port statistics in the Curr (current) column to zero, click **Clear All PM Statistics**.

Step 8 Click **OK** to confirm the change.

Stop. You have completed this procedure.

NTP-G345 Viewing Ethernet Statistical PM Counts

Purpose	This procedure enables you to view current and historical statistical PM counts for an interface on the Cisco CRS router.
Tools/Equipment	None

Prerequisite Procedures	DLP-G46 Log into CTC
Required/As Needed	As needed
Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Note This procedure applies to Cisco CRS routers 6.x.

Procedure

Step 1 From the View menu, choose **Go to Network View** to view the circuits for an entire network.

Step 2 Double-click the Cisco CRS router node in the circuit.

Step 3 Choose an interface on the Cisco CRS router.

Step 4 Click the **Ethernet Stats** tab.

The Current tab is displayed by default.

Step 5 To view the current ethernet statistics, perform the following steps:

a) To change the interval to 1 day, click the 1 day radio button followed by **Refresh**.

Ethernet statistics for the interface appear. The interval is set to 15 min by default.

b) To reset the statistics in the Curr column to zero for the 15 min and 1 day intervals respectively, click **Clear**.

Step 6 To view the historical ethernet statistics, perform the following steps:

a) Click the **History** tab.

b) To change the interval to 1 day, click the 1 day radio button followed by **Refresh**.

Ethernet statistics for the interface appear in the Prev (previous) and Prev-n (previous) columns. The interval is set to 15 min by default.

Stop. You have completed this procedure.

NTP-G193 Enable or Disable AutoPM

Purpose	This procedure allows you to enable or disable automatic autonomous performance monitoring (AutoPM) reports.
Tools/Equipment	None
Prerequisite Procedures	"DLP-G46 Log into CTC" task at Connect the PC and Log into the GUI document.
Required/As Needed	As needed

Onsite/Remote	Onsite or remote
Security Level	Provisioning or higher

Procedure

Step 1 Click the **Provisioning** > **Defaults** tabs.

Step 2 In the Defaults Selector area, click **NODE** > **General** and choose **NODE.general.AutoPM**.

Step 3 In the Default Value field, select **True** to enable AutoPM.

Step 4 Click **Apply**.

Step 5 Follow Steps 1 through 5 to disable AutoPM. Select **False** in the Default Value field in Step 4 before proceeding to Step 5.

Stop. You have completed this procedure.

Additional References

Related Documents

Use this document in conjunction with the other release-specific documentation listed in this table:

Link	Description
Cisco ONS Documentation Roadmap	Provides quick access to publications of Cisco ONS releases.
Cisco ONS 15454 DWDM Control Card and Node Configuration Guide	Provides background and reference material and procedures for installation and configuration of control cards and node configuration on Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.
Cisco ONS 15454 DWDM Line Card Configuration Guide	Provides background and reference material and procedures for installation and configuration of line cards on Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.
Cisco ONS 15454 DWDM Network Configuration Guide	Provides background and reference material, procedures for turn up, provisioning, and maintenance of Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.
Cisco ONS 15454 DWDM Troubleshooting Guide	Provides general troubleshooting instructions, alarm troubleshooting instructions, and a list of error messages that apply to the Cisco ONS 15454 dense wavelength division multiplexing (DWDM) systems.
Release Notes for Cisco ONS 15454	Provides information about new features and enhancements for the Cisco ONS 15454 DWDM platforms.
Cisco ONS 15454 Hardware Installation Guide	Provides installation information of the Cisco ONS 15454 hardware.

Link	Description
Cisco ONS 15454 DWDM Licensing Guide	Provides information about installing and managing Cisco ONS 15454 DWDM licenses.
Cisco ONS SDH TL1 Command Guide *Cisco ONS SONET TL1 Command Guide*	Provides a comprehensive list of TL1 commands.
Installing the GBIC, SFP, SFP+, XFP, CXP, CFP, and CPAK Optical Modules in Cisco ONS Platforms	Provides information about the Pluggable Port Modules support.

Link	Description
Cisco NCS 2000 Series Documentation Roadmap	Provides quick access to publications of Cisco NCS 2000 Series releases.
Cisco NCS 2000 Series Control Card and Node Configuration Guide	Provides background and reference material and procedures for installation and configuration of control cards and node configuration on Cisco NCS 2000 Series systems.
Cisco NCS 2000 Series Line Card Configuration Guide	Provides background and reference material and procedures for installation and configuration of line cards on Cisco NCS 2000 Series systems.
Cisco NCS 2000 Series Network Configuration Guide	Provides background and reference material, procedures for turn up, provisioning, and maintenance of Cisco NCS 2000 Series systems.
Cisco NCS 2000 Series Troubleshooting Guide	Provides general troubleshooting instructions, alarm troubleshooting instructions, and a list of error messages that apply to the Cisco NCS 2000 Series systems.
Release Notes for Cisco NCS 2000 Series	Provides information about new features and enhancements for the Cisco NCS 2000 Series systems.
Cisco NCS 2000 Series Hardware Installation Guide	Provides installation information of the Cisco NCS 2000 Series hardware.
Cisco NCS 2000 Series Licensing Configuration Guide	Provides information about installing and managing NCS licenses.
Cisco NCS 2000 Series TL1 Command Guide	Provides a comprehensive list of TL1 commands.
Installing the GBIC, SFP, SFP+, XFP, CXP, CFP, and CPAK Optical Modules in Cisco NCS Platforms	Provides information about the Pluggable Port Modules support.

Technical Assistance

Link	Description
http://www.cisco.com/support	The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.

Short Description

Obtaining Documentation and Submitting a Service Request

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