Using the CPT System

This chapter describes how to unify both packet and transport technologies using the Carrier Packet Transport (CPT) System. It contains the following sections:

What Is the CPT System?

The CPT System is the first Packet-Optical Transport System (P-OTS) built on standards-based MPLS-TP technology. The CPT System unifies both packet and transport technologies, giving a strong foundation for next-generation transport. The CPT System is designed to support transport applications so that service providers can continue to offer existing transport services while enabling new packet services.

The existing transport networks must be migrated from TDM networks to packet transport networks because the packet-based services dominate the overall network traffic. Next-generation transport networks enable and support new mesh, multipoint, and multidirectional services. By deploying packet transport networks, you can benefit from:

- Statistical multiplexing
- Dynamic bandwidth allocation
- QoS

Note CPT System is displayed as “PT System” in the Prime Optical user interface.

The CPT System provides the following benefits:

- Ensures a smooth and efficient transition from TDM networks to packet transport networks
- Enables you to deploy new packet transport networks
- Provides architectural flexibility with support for:

  - MPLS-TP
  - IP/MPLS
  - Carrier Ethernet transport
- Provides data plane and control plane flexibility in network deployments
- Enables service providers to provide the following for residential and business customers:
  - Mobile back-haul
  - Ethernet services
  - TDM services

The following topics describe related Prime Optical features and options:

- Understanding CPT Cards, page 13-3
- Overview of the CPT System Property Sheet, page 13-4
- Understanding the CPT System Alarms, page 13-6

Understanding User Privileges and Tasks

This section describes the user privileges, CPT System tasks, and new UI options.

The following table describes the Prime Optical default user profiles and the privileges associated with each profile.

Table 13-1 User Privileges

Role	Privileges
SuperUser	• Tasks—Allowed to perform all the tasks listed in Table 13-2. • UI Options—All the UI options are visible.
NetworkAdmin	• Tasks—Allowed to perform all the tasks listed in Table 13-2. • UI Options—All the UI options are visible.
SysAdmin	• Tasks—Cannot perform any of the tasks listed in Table 13-2. • UI Options—None of the UI options are visible.
Provisioner	• Tasks—Allowed to perform all the tasks listed in Table 13-2. • UI Options—All the UI options are visible.
Operator	• Tasks—Cannot perform any of the tasks listed in Table 13-2. • UI Options—All the UI options are visible.

The following table describes the CPT System tasks and UI options.

Note CPT System is displayed as “PT System” in the Prime Optical user interface.

Table 13-2 CPT System Tasks and UI Options

Task	Navigation	For More Information, See...
Viewing the PT System configuration mode	**NE Explorer > PT System > Provisioning > Configuration Mode**	Configuration Mode, page 13-5
Launching CPT IOS CLI	**NE Explorer > PT System > Provisioning > IOS CLI**	IOS CLI, page 13-5
Configuring SyncE ports	**NE Explorer > PT System > Provisioning > Timing**	Timing, page 13-6

Unsupported Features

The CPT 200 and CPT 600 NEs do not support the following:

- Creating a server trail
- Managing VLANs
- Creating and managing BLSR
- ML cards
- Creating and managing SVLANs
- Viewing the IOS Users table
- Launching the L2 Topology table from the NE Explorer

CPT System

This section describes the following:

- Understanding CPT Cards, page 13-3
- Overview of the CPT System Property Sheet, page 13-4
- Understanding the CPT System Alarms, page 13-6

Understanding CPT Cards

Note CPT System is displayed as “PT System” in the Prime Optical user interface.

The CPT System is supported on the CPT 200 and CPT 600 chassis. The CPT 200 chassis consists of two service slots and has a 160-GB switch capacity. The CPT 600 chassis consists of six service slots and has a 480-GB switch capacity.

The following are the CPT cards:

- PTF_10GE_4—See Slot Properties—PTF_10GE_4, page C-533.
- PT_10GE_4—See Slot Properties—PT_10GE_4, page C-872.

The PTSA_GE panel is a standalone unit and can be connected to the PT System. The PTSA_GE panel enables the number of ports to be scaled on the CPT System. For more information, see Slot Properties—PTSA_GE, page C-879.

PTF_10GE_4 and PT_10GE_4 cards are supported on the CPT 200 and CPT 600 platforms. The CPT System complies with RoHS-6 standards.

The following system configuration is recommended on the CPT 200 shelf:

- Standalone PTF_10GE_4 card
- Standalone TNC, TNCE, TSC, or TSCE card
- One or more PTSA_GE panels

The following system configuration is recommended on the CPT 600 shelf:

- Redundant PTF_10GE_4 cards
- One PT_10GE_4 card
- Redundant TNC, TNCE, TSC, or TSCE cards
- One or more PTSA_GE panels

The CPT System integrates DWDM, OTN, Ethernet, and standards-based MPLS-TP in a single system. The CPT System also integrates with other Cisco platforms such as the ONS 15454, and Carrier Routing System to deliver a combined IP/MPLS and MPLS-TP solution under a single control plane, forwarding mechanism, and NMS. This solution enables you to interoperate with existing IP/MPLS networks.

The CPT System works in the metro edge and access portion of the network, providing an integrated packet and transport solution. The CPT System significantly reduces rack space and power consumption.

The following topics describe the CPT cards:

- Slot Properties—PTF_10GE_4, page C-533
- Slot Properties—PT_10GE_4, page C-872
- Slot Properties—PTSA_GE, page C-879

Overview of the CPT System Property Sheet

For descriptions of the CPT System, CPT cards, and LACP, see the following sections:

- What Is the CPT System?, page 13-1
- Understanding CPT Cards, page 13-3

Note CPT System is displayed as “PT System” in the Prime Optical user interface.

When you choose **Configuration > NE Explorer** for the ONS 15454 SONET or ONS 15454 SDH, the window that Prime Optical displays consists of a tree on the left side and a properties pane on the right. The tree provides a hierarchical view of the NE’s physical shelves and slots. In the tree, click **PT System** to open the PT System property sheet. The properties pane shows information about the PT System.

This section includes:

- Identification, page 13-5
- Configuration Mode, page 13-5
- IOS CLI, page 13-5

- Timing, page 13-6

When you open the PT System, the default property displayed is the Identification property.

Identification

The Identification property displays the list of CPT cards managed by the PT System. The Identification property displays the details in a table. The table has two columns:

- Physical Location—Displays the following details:
  - Shelf number
  - Slot number
  - Fan-Out-Group (FOG) number
- Module Name—Displays the name of the card or panel.

Configuration Mode

The Configuration Mode property is display only. The Operation Mode field in the Configuration Mode property displays the operation mode of the PT System. The operation mode can be IOS Mode or CTC Mode.

Note If you switch from CTC Mode to IOS Mode, all the Layer 2 services are deleted automatically.

In IOS Mode, you cannot perform the following operations:

- Create Layer 2 services
- View Layer 2 services
- Modify Layer 2 services
- Trace Layer 2 services
- Troubleshoot Layer 2 services

Note The Configuration Mode is displayed as IOS Mode from Prime Optical 9.8 release. It is because the IOS Mode contains the CPT device in it. The users do not have to worry about how the CPT device is actually configured in IOS Mode.

IOS CLI

Monitor Layer 2 service level performance counters using the IOS CLI property. From the PT System IOS CLI Interface area, click **Launch CLI**.

- If you are using a Solaris or Linux operating system, an xterm window runs a Telnet tunnel connection to the active PTF_10GE_4 card IOS console of the PT System.
- If you are using a Windows operating system and if Telnet is installed on the PC running the Prime Optical client, Telnet is directly used to open the tunnel connection.

From the IOS CLI window, you can run the **show interfaces** command. You can also run other Cisco IOS commands on the IOS CLI, but it depends on the security settings and the account active on the PT System.

Timing

A separate external TDM circuit is required to provide synchronized timing to multiple remote NEs for packet transport networks such as the CPT System. The Synchronous Ethernet (SycnE) feature addresses this requirement by providing effective timing to the remote NEs through a packet network without using an external circuit for timing.

The Timing property allows you to configure SyncE ports.

The following table describes the Timing property table fields.

Table 13-3 Field Descriptions for the Timing Property Table

Field	Description
Card	*Display only.* Displays the card number and slot number.
Port	*Display only.* Displays the port number (n-n) and rate.
ProvidesSync	*Display only.* Selects the port automatically after the port is used as a clock source.
SyncMsgIn	Sets the EnableSync card parameter. Enables synchronization status messages, which allow the node to choose the best timing source.
Admin SSM In	Overrides the synchronization status message (SSM) and the synchronization traceability unknown (STU) value. If the node does not receive an SSM signal, it defaults to STU. The options are: • PRS—Primary reference source (Stratum 1) • ST2—Stratum 2 • TNC—Transit node clock • ST3E—Stratum 3E • ST3—Stratum 3 • SMC-SONET minimum clock • ST4—Stratum 4 • DUS—Do not use for timing synchronization • RES—Reserved; quality level set by the user
Send DoNotUse	When checked, sends a DUS message as the QL value.
ESMC Enable	Check the check box on the port where you want to enable SyncE. You can select the clock source among the Ethernet Synchronization Message Channel (ESMC) enabled ports. To select the clock source among the OTN ports, do not check the check box.

Understanding the CPT System Alarms

In Prime Optical 9.8, new alarms have been introduced for the CPT System. This section includes:

- Equipment Alarms, page 13-7
- Satellite Alarms, page 13-7

Equipment Alarms

Table 13-4 describes the equipment alarms.

Table 13-4 Equipment Alarms

Alarm	Description	Logical Object
CUTOVER	The Planned Switch Over alarm is raised when a planned switchover of the PTF_10GE_4 card occurs.	EQPT
RESOURCES_LOW	The Running Low on Resources alarm is raised if the resource memory is very low or if more resources cannot be configured.	EQPT
RESOURCES_OVER	The No More Resources Available alarm is raised if the resource memory is used completely or if configuring of resources is not possible.	EQPT

Satellite Alarms

Table 13-5 lists and describes the satellite alarms. The satellite alarms listed in the following table are raised when satellite communication is impacted between PTF_10GE_4, PT_10GE_4, and PTSA_GE.

Table 13-5 Satellite Alarms

Alarm	Description
SAT_DISCOVERY_FAIL	Satellite panel discovery failure.
SAT_ACT_LINK_FAIL	Satellite panel active link failure.
SAT_COMM_FAIL	Satellite panel communication failure.
SAT_IMPROPER_CONFIG	Satellite panel improper configuration.
SAT_FAN_MEA	Satellite panel fan mismatch of equipment and attributes.
SAT_FAN_FAIL	Satellite panel fan failure.
SAT_FAN_DEGRADE	Satellite panel partial fan failure.
SAT_FAN_MFGMEM	Satellite panel fan manufacturing data memory (EEPROM) failure.
SAT_FAN_MISSING	Satellite panel fan unit is missing.
SAT_IHITEMP	Satellite panel industrial high temperature.
SAT_HITEMP	Satellite panel high temperature.
SAT_BAT_FAIL	Satellite panel battery failure.
SAT_BAT_FAIL_A	Satellite panel battery A failure.
SAT_BAT_FAIL_B	Satellite panel battery B failure.

Port Alarms

Table 13-6 describes the port alarms.

Table 13-6 Port Alarms

Alarm Name/Condition	PTF_10GE_4 Client	Required on PTF_10GE_4 Trunk Ports	Required on PT_10GE_4 Client	Required on PTSA_GE 1G Port	Required on PTSA_GE Client
MAC_MOVE—MAC address is relearned on a different port in the same bridge domain	Yes	Yes	Yes	Yes	—
SAT_ACTIVE_LINK_FAIL—Satellite panel active link failure	Yes	Yes	Yes	—	—
Legacy Alarms on PTF_10GE_4 and PT_10GE_4					
SYNCLOSS	Yes	Yes	Yes	Yes	Yes
SIGLOSS	Yes	Yes	Yes	Yes	Yes
LOCAL-FAULT	Yes	Yes	Yes	No	Yes
REMOTE-FAULT	Yes	Yes	Yes	No	Yes
SF	No	Yes	No	No	No
SD	No	Yes	No	No	No
FEC-MISM	No	Yes	No	No	No
UNC-WORD	No	Yes	No	No	No
GCC-EOC	No	Yes	No	No	No
HELLO	—	Yes	—	—	—
ISIS-ADJ-FAIL	No	No	No	No	No
PROV-MISMATCH	Yes	Yes	Yes	Yes	Yes
TRAIL-SIGNAL	—	—	—	—	—
LMP-SD	No	No	No	No	No
LMP-SF	No	No	No	No	No
LMP-UNALLOC	No	No	No	No	No
LMP-FAIL	No	No	No	No	No
UNC-WORD	No	Yes	No	No	No
LOF	Yes	Yes	Yes	Yes	Yes
LOS	Yes	Yes	Yes	Yes	Yes
OUT-OF-SYNC	Yes	Yes	Yes	Yes	Yes
OTUK-IAE	No	Yes	No	No	No
OTUK-SD	No	Yes	No	No	No
OTUK-SF	No	Yes	No	No	No
OTUK-TIM	No	Yes	No	No	No
LOM	No	Yes	No	No	No
OTUK-LOF	No	Yes	No	No	No
FEC-MISM	No	Yes	No	No	No
OTUK-AIS	No	Yes	No	No	No
ODUK-BDI-PM	—	Yes	—	—	—

Table 13-6 Port Alarms (continued)

Alarm Name/Condition	PTF_10GE_4 Client	Required on PTF_10GE_4 Trunk Ports	Required on PT_10GE_4 Client	Required on PTSA_GE 1G Port	Required on PTSA_GE Client
OTUK-BDI	—	Yes	—	—	—
ODUK-SD-PM	—	Yes	—	—	—
ODUK-SF-PM	—	Yes	—	—	—
ODUK-TIM-PM	—	Yes	—	—	—
ODUK-AIS-PM	—	Yes	—	—	—
ODUK-LCK-PM	—	Yes	—	—	—
ODUK-OCI-PM	—	Yes	—	—	—
HI-RXPOWER	Yes	Yes	Yes	Yes	Yes
LO-RXPOWER	Yes	Yes	Yes	Yes	Yes
HI-TXPOWER	Yes	Yes	Yes	Yes	Yes
LO-TXPOWER	Yes	Yes	Yes	Yes	Yes
HI-LASERBIAS	Yes	Yes	Yes	Yes	Yes
LO-LASERBIAS	Yes	Yes	Yes	Yes	Yes
HI-LASERTEMP	Yes	Yes	Yes	Yes	Yes
LO-LASERTEMP	Yes	Yes	Yes	Yes	Yes
HI-PELTIER	—	—	—	—	—
LO-PELTIER	—	—	—	—	—
HI-XCVRVOLT	—	—	—	—	—
LO-XCVRVOLT	—	—	—	—	—
WVL-MISMATCH	No	Yes	No	No	No
PORT-COMM-FAI	—	—	—	—	—
DSP-FAIL	—	—	—	—	—
UT-COMM-FAIL	—	—	—	—	—
UT-FAIL	—	—	—	—	—
LASER-OFF-WVL	—	—	—	—	—
TX-OFF-NON-CI	Yes	Yes	Yes	Yes	Yes
PORT-CODE-MIS	—	—	—	—	—
PORT-COMM-FAI	—	—	—	—	—
PORT-MISMATCH	—	—	—	—	—
PORT-MISSING	—	—	—	—	—
LPBKTERMINAL	Yes	Yes	Yes	Yes	Yes
LPBKFACILITY	Yes	Yes	Yes	Yes	Yes
HELLO	—	—	—	—	—
ISIS-ADJ-FAIL	—	—	—	—	—
AS-CMD	—	—	—	—	—

Table 13-6 Port Alarms (continued)

Alarm Name/Condition	PTF_10GE_4 Client	Required on PTF_10GE_4 Trunk Ports	Required on PT_10GE_4 Client	Required on PTSA_GE 1G Port	Required on PTSA_GE Client
AS-MT	—	—	—	—	—
NEIGHBOR-ADJACENCY-FAILURE	Yes	Yes	Yes	Yes	No
LINK-FLAPPING	Yes	Yes	Yes	Yes	No
MIS-CONFIGURED-SEGMENT	Yes	Yes	Yes	Yes	No
VLB-FAILED	Yes	Yes	Yes	Yes	No
VLB-DEACTIVATED	Yes	Yes	Yes	Yes	No
PRIMARY-EDGE-PORT-ELECTED	Yes	Yes	Yes	Yes	No
SECONDARY-EDGE-PORT-ELECTED	Yes	Yes	Yes	Yes	No
SEGMENT-HEALED	Yes	Yes	Yes	Yes	No
STNC-GENERATED	Yes	Yes	Yes	Yes	No
VLB-ACTIVATED	Yes	Yes	Yes	Yes	No
VLB-TRIGGER-DELAY-ACTIVE	Yes	Yes	Yes	Yes	No

Service Alarms

Table 13-7 describes the service alarms.

Table 13-7 Service Alarms

Alarms	Description	Level
PW Alarms		
WKG_PW_CP_DOWN	Working pseudowire control plane down alarm. This alarm is raised on the port if the working pseudowire control plane is down.	Port/PTS_CHANNEL_GROUP
PRT_PW_CP_DOWN	Protect pseudowire control plane down alarm. This alarm is raised on the port if the protect pseudowire control plane is down.	Port/PTS_CHANNEL_GROUP
WKG_PW_CC_DOWN	Working pseudowire continuity check down alarm. This alarm is raised on the port if the working pseudowire continuity check is down.	Port/PTS_CHANNEL_GROUP
PRT_PW_CC_DOWN	Protect pseudowire continuity check down alarm. This alarm is raised on the port if the protect pseudowire continuity check is down.	Port/PTS_CHANNEL_GROUP
PW_ WKSWPR	Pseudowire traffic switched to protection alarm. This alarm is raised on the port when the pseudowire traffic is switched from the working path to the protected path.	Port/PTS_CHANNEL_GROUP
WKG_PW_LOC_AC_TX_FLT	Working pseudowire local AC Tx port fault alarm. This alarm is raised when a working pseudowire local AC Tx port fault is detected.	Port/PTS_CHANNEL_GROUP

Table 13-7 Service Alarms (continued)

Alarms	Description	Level
PRT_PW_LOC_AC_TX_FLT	Protect pseudowire local AC Tx port fault alarm. This alarm is raised when a protect pseudowire local AC Tx port fault is detected.	Port/PTS_CHANNEL_GROUP
WKG_PW_LOC_AC_RX_FLT	Working pseudowire local AC Rx port fault alarm. This alarm is raised when a working pseudowire local AC Rx port fault is detected.	Port/PTS_CHANNEL_GROUP
PRT_PW_LOC_AC_RX_FLT	Protect pseudowire local AC Rx port fault alarm. This alarm is raised when a protect pseudowire local AC Rx port fault is detected.	Port/PTS_CHANNEL_GROUP
WKG_PW_REM_AC_TX_FLT	Working pseudowire remote AC Tx port fault alarm. This alarm is raised when a working pseudowire remote AC Tx port fault is detected.	Port/PTS_CHANNEL_GROUP
PRT_PW_REM_AC_TX_FLT	Protect pseudowire remote AC Tx port fault alarm. This alarm is raised when a protect pseudowire remote AC Tx port fault is detected.	Port/PTS_CHANNEL_GROUP
WKG_PW_REM_AC_RX_FLT	Working pseudowire remote AC Rx port fault alarm. This alarm is raised when a working pseudowire remote AC Rx port fault is detected.	Port/PTS_CHANNEL_GROUP
PRT_PW_REM_AC_RX_FLT	Protect pseudowire remote AC Rx port fault alarm. This alarm is raised when the protect pseudowire remote AC Rx port fault is detected.	Port/PTS_CHANNEL_GROUP
S_PE Alarms		
WKG_LOC_PW_NOT_FWD	Working local pseudowire not forwarding alarm. This alarm is raised when the local working pseudowire is not forwarding traffic.	PTS**
PRT_LOC_PW_NOT_FWD	Protected local pseudowire not forwarding alarm. This alarm is raised when the local protect pseudowire is not forwarding traffic.	PTS**
WKG_REM_PW_NOT_FWD	Working remote pseudowire not forwarding alarm. This alarm is raised when the remote working pseudowire is not forwarding traffic.	PTS**
PRT_REM_PW_NOT_FWD	Protect remote pseudowire not forwarding alarm. This alarm is raised when the remote protect pseudowire is not forwarding the traffic.	PTS**
MPLS_TP Alarms		
TP_TUNNEL_DOWN	MPLS-TP tunnel down alarm. This alarm is raised when the working or protect LSP is down.	PTS**
WKG_LSP_DOWN	Working LSP down alarm. This alarm is raised on the port if the working LSP is down.	Port/PTS_CHANNEL_GROUP
PRT_LSP_DOWN	Protect LSP down alarm. This alarm is raised on the port if the protect LSP is down.	Port/PTS_CHANNEL_GROUP
WKG_LSP_AIS	Working LSP alarm indication signal. This alarm is raised when the working LSP receives an LSP alarm indication signal.	Port/PTS_CHANNEL_GROUP

Table 13-7 Service Alarms (continued)

Alarms	Description	Level
PRT_LSP_AIS	Protect LSP alarm indication signal. This alarm is raised when the protect LSP receives an LSP alarm indication signal.	Port/PTS_CHANNEL_GROUP
WKG_LSP_RDI	Working LSP remote defect indication. This alarm is raised when the working LSP receives an LSP remote defect indication.	Port/PTS_CHANNEL_GROUP
PRT_LSP_RDI	Protect LSP remote defect indication. This alarm is raised when the protect LSP receives an LSP remote defect indication.	Port/PTS_CHANNEL_GROUP
BFD_DOWN	BFD down alarm. This alarm is raised when the BFD is not enabled on the port.	Port/PTS_CHANNEL_GROUP
TP_WKSPWR	TP traffic switched to protection alarm. This alarm is raised when the MPSL-TP traffic switches from working pseudowire to protected pseudowire.	Port/PTS_CHANNEL_GROUP
WKG_TP_LOCKOUT	Working TP lockout alarm. This alarm is raised when the lockout request is set to ON for the working MPLS-TP.	Port/PTS_CHANNEL_GROUP
PRT_TP_LOCKOUT	Protect TP lockout alarm. This alarm is raised when the lockout request is set to ON for the protect MPLS-TP.	Port/PTS_CHANNEL_GROUP
WKG_LSP_LDI	Working LSP link defect indication. This alarm is raised when the working LSP receives an LSP link defect indication.	Port/PTS_CHANNEL_GROUP
PRT_LSP_LDI	Protect LSP link defect indication. This alarm is raised when the protect LSP receives an LSP link defect indication.	Port/PTS_CHANNEL_GROUP
WKG_LSP_LKR	Working LSP lock report alarm. This alarm is raised when an interface is administratively shutdown on a working path in an MPLS-TP tunnel.	Port/PTS_CHANNEL_GROUP
PRT_LSP_LKR	Protect LSP lock report alarm. This alarm is raised when an interface is administratively locked and a lockout request (LKR) is generated on the nearest reachable endpoint.	Port/PTS_CHANNEL_GROUP
EVC Alarms		
EFP_FAIL	EFP failed alarm. This alarm is raised when the EFP fails due to incomplete hardware provisioning or when the interface on which the EFP is present goes down.	Port
MPLS_TE		
TE_TUNNEL_DOWN	TE tunnel down alarm. This alarm is raised when the working and protected MPLS-LSP goes down.	PTS**