Cisco CPT Packet Transport Fabric 256G Fabric Card with 4x10GE

The Cisco® Carrier Packet Transport (CPT) 200 and 600 sets the industry benchmark as a carrier-class converged access and aggregation platform for Unified Packet Transport architectures. Cisco CPT product family represents an exciting new paradigm in the world of Packet Transport with exceptional pay as you grow scalability, carrier-class reliability, incredible flexibility, and TDM like ease of packet service provisioning, OAM and protection capability.

Product Overview

The Cisco CPT 200 and 600 Packet Transport Fabric (PTF) Line Card is a non-blocking switch fabric that delivers economical, scalable, highly available, and Packet Transport services through a Unified Multiprotocol Label Switching (MPLS) network layer. The PTF 256 Gigabit non-blocking switch fabric interconnects all Packet Transport line cards over the backplane while providing scalability and high availability active-active architecture. In addition, the PTF delivers four 10-Gigabit Ethernet ports that can be used for User-to-Network Interfaces, Network-to-Network Interfaces, and enables extension of GE interfaces through the CPT 50 satellite architecture. The PTF enable the Cisco CPT 200 and 600 provide a robust MPLS-Transport Profile (TP) infrastructure to deliver scalable Private Line, Business, Residential, Mobile Backhaul, Data Center, and Video Services (Figure 1).

Figure 1. Cisco CPT Packet Transport Fabric (PTF) Line Card

Features and Benefits

Cisco CPT 200 and 600 PTF offers:

- 256 Gbps of non-blocking fully redundant switching fabric
- Distributed forwarding and control planes for higher performance
- Modularized system components in both hardware and software, isolating failure and faults to subsystem and component
- Hardware-based signaling for the fabric: support for near zero packet loss on switchover
- Built-in redundancy in hardware components such as the route switch processor (RSP), switch fabric, control-plane chassis control bus, and power supplies, thereby avoiding a single point of failure
- 4 port of 10Gbps Ethernet Interfaces that operate as UNI, NNI, & Satellite architecture extension
- Hardware based Bidirectional Forwarding Detection (BFD) processing and control that provide transport SLA detection times

With integrated synchronization circuitry and dedicated backplane timing traces for accessing the shelf controllers Stratum-3 subsystem, the CPT 200 and 600 PTF Line Card provides standards-based line-interface functions for delivering and deriving transport-class network timing, enabling support of network-synchronized services and applications such as mobile backhaul and migration of TDM services.

The PTF also consolidating Unified MPLS transport and DWDM networking by integrating the G.709 OTN layer with both I.7 and I.4 Enhanced Forward Error Correction (EFEC) into two 10GE ports. The G.709 provides visibility into the DWDM transmission system to permit rapid detection and recovery from transmission-layer and DWDM impairments and G.709 can also be configured for proactive protection if signal degradation is detected; it prevents traffic loss and link outage. The Enhanced Forward Error Correction extends transmission-layer performance, delivering extended performance over an amplified system without the cost of regeneration or transponders.

Product Specifications

Table 1.

Description	Specification
Interface Support	
Pluggable SFP+ Interfaces	SFP+ interfaces provide mix/match interface types across a single line card. For a complete list of supported interfaces, please see the Cisco CPT pluggable configuration guide.
Pluggable XFP Interfaces with OTN G.709	Standard G.709 providing transmission-layer OA&M; G.709 Standard FEC and Enhanced FEC (both I.4 & I.7 support) for extended transmission system performance
Scalable and Integrated Multiservice Support	
Layer 2 Transport	Carrier Ethernet, MPLS-Transport Profile (TP) and IP/MPLS-(TE)
Layer 2 and Layer 2+ services	Carrier Ethernet - EPL, EVPL, ELAN, EVPLAN
	MPLS-TP – P2P Circuits (VPWS), Multipoint (VPLS), Hierarchy Multipoint (H-VPLS), Ring VPLS (Optimized for Video Broadcast applications)
	IP/MPLS(TE) – P2P Circuits (VPWS), Multipoint (VPLS), Hierarchy Multipoint (H-VPLS), Ring VPLS (Optimized for Video Broadcast applications)
Service Scale	
MAC Address	256K
Point to Point Ethernet Virtual Circuit (EVC)	16K
VPWS	3.5K

Description	Specification		
PW Redundancy	2.5K		
Point to Multi-Point Ethernet Virtual Circuit (EVC)	4K with 8K members		
VPLS	1K		
MPLS-TP LSP Un-Protected	2K		
MPLS-TP LSP Protected	1K		
REP	32 Segments		
Multicast Groups	2K		
Policers	8K Policers 2-rate 3-color (2R3C)		
Egress queues	64K Queues (3-level H-QoS)		
Switch Fabric	256 Gbps Non-Blocking		
Ethernet OAM			
CFM	Interval	Remote MEPs	Local MEPs
	100 ms	100	100
	1 sec	1000	1000
	10 sec	8000	8000
	1 min	16000	16000
	10 min	16000	16000
EFM	Per Interface		
ITU Y.1731 (FM)	Same as CFM		
ITU Y.1731 (DM)	Type	Interval	# of Sessions
	Line Card	1 sec	100
	System	1 sec	1000
MPLS-TP OAM			
BFD	Interval	# of Sessions	
	3.3 ms	1000	
High Availability			
High Availability features	Stateful Switchover (SSO) In Service Software Upgrade (ISSU) MPLS-TP 1:1 path protection Link Aggregation (LAG) Resilient Ethernet Protocol (REP)		
Multicast			
Multicast features	IGMP snooping v1, v2, and v3 Multicast VLAN registration (MVR)		

Product Specifications

Table 2.   Product Specifications

Description	Specification
Evolutionary Monitoring	
Carrier-class Operations, Administration, and Maintenance (OA&M)	IETF MPLS-TP Continuity Checks (CC) Bidirectional Forwarding Detection (BFD) (RFC5860) IETF MPLS-TP Continuity Verification (CV) LSP Ping and LSP Traceroute IP/MPLS OAM Virtual Circuit Connectivity Verification (VCCV), Ping, and Traceroute Connectivity Fault Management (802.1ag) Ethernet Link OAM (802.3ah) ITU Y.1731 Fault Management & Delay Management

Description	Specification
Network Timing and Synchronization	
Synchronous Ethernet	Derive and provide synchronization from BITS and Ethernets interfaces on CPT 200 and 600
IEEE 1588v2 PTP	Derive, Provide, and Transparently passes timing and frequency information on all CPT 200 and 600 Ethernet interfaces
Product Functionality, Benefits and Specifications	
Software Support	• Cisco Transport Controller: End-to-End Network Point and Click Provisioning, Maintenance, & Alarm Correlation. • Integrated Robust Command Line Interface (CLI)

MPLS-Transport Profile (TP)	• IETF Standard Based MPLS-Transport Profile:
	  ◦ RFC 5317
	  ◦ RFC 5654
	  ◦ RFC 5921
	  ◦ RFC 5880
	  ◦ RFC 5960
	  ◦ RFC 5586
	  ◦ RFC 5951
	  ◦ RFC 5950

Flexible Ethernet services	• Ethernet Virtual Connections (EVCs): Ethernet services are supported using individual EVCs to carry traffic belonging to a specific service type or end user through the network. EVC-based services can be used in conjunction with MPLS-based L2VPNs and native Ethernet switching deployments. • Flexible VLAN classification: VLAN classification into Ethernet flow points (EFPs) includes single-tagged VLANs, double-tagged VLANs (QinQ and 802.1ad), contiguous VLAN ranges, and noncontiguous VLAN lists. • IEEE Bridging: The line cards support native bridging based on IEEE 802.1Q, IEEE 802.1ad, and QinQ VLAN encapsulation mechanisms. • Resilient Ethernet protocol (REP): The REP provides a resilient, fast-convergence mechanism for aggregating and connecting to Ethernet-based access rings.
L2VPN services	• MPLS-TP Circuit with Ethernet over MPLS-TP (EoMPLS-TP): EoMPLS-TP transports Ethernet frames across an MPLS-TP LSPs using pseudowires. Individual EFPs or traffic from an entire port can be transported over an MPLS-TP network using pseudowires to an egress interface or sub-interface. • Virtual Private LAN Services (VPLS): These services are included in a class of VPN that supports the connection of multiple sites in a single bridged domain over a MPLS-TP network. VPLS presents an Ethernet interface to customers, simplifying the LAN and WAN boundary for service providers and customers, and enabling rapid and flexible service provisioning, because the service bandwidth is not tied to the physical interface. All services in a VPLS appear to be on the same LAN, regardless of location. • Pseudowire redundancy: Pseudowire redundancy supports the definition of a backup pseudowire to protect a primary pseudowire in case of failure. • Multi-segment pseudowire stitching: Multi-segment pseudowire stitching is a method for interworking two pseudowires together to form a cross-connect relationship.
SPAN	• Span is a technique of replicating the ingress or egress frames in a specific port to a specified list of destination ports. It is a monitoring feature used to monitor the traffic that is coming out of a port or an EFP. The monitored traffic can be used to debug the network and can also be used by law enforcement agencies.
High Availability	• MPLS-TP: 1:1 MPLS TP LSP delivers protection switching for networks with sub-50ms APS switching for link, node, path failures. • Bidirectional Forwarding Detection (BFD): BFD is a detection protocol that is designed to provide fast forwarding path-failure detection times for all media types, encapsulations, topologies, and routing protocols • 802.3ad Link Aggregation Bundles: The line cards support a bundle of multiple links to provide added resiliency and the ability to load balance traffic over multiple member links.
Multicast	• IGMP v2 and v3 snooping: This Layer 2 mechanism efficiently tracks multicast membership on an L2VPN network. Individual IGMP joins are snooped at the VLAN level or pseudowire level. In residential broadband deployments, this scenario enables the network to send only channels that are being watched to downstream users. • Multicast VLAN Registration (MVR): MVR optimizes the control plane (IGMP) load between the router and switch. MVR feature enables switch to aggregate different JOINs received on different VLANs (from the receivers) into one JOIN (on a single VLAN, which could be the same as or different from the VLANs of the receiving ports) towards the router. The switch then distributes (replicate) the received content into the relevant ports.

Description	Specification
Ethernet OA&M	• Connectivity Fault Management (CFM) Ethernet layer OAM protocol provides end-to-end provider edge (PE to PE) and/or customer edge to customer edge (CE to CE) fault management. CFM includes proactive connectivity monitoring, fault verification, and fault isolation for large Ethernet metropolitan-area networks (MANs) and WANs. CFM is defined by IEEE 802.1ag standard.
	• Ethernet Link OAM is a protocol for installing, monitoring, and troubleshooting Ethernet metropolitan-area networks (MANs) and Ethernet WANs. It relies on an optional sublayer in the data link layer of the Open Systems Interconnection (OSI) model. Ethernet Link OAM is defined by IEEE 802.3ah standard.
	• Remote Ethernet Port Shutdown. The Remote Ethernet Port Shutdown replicates a local link failure over an EoMPLS pseudowire to a remote link shutdown the remote Ethernet port down. Bot UNI interfaces connected to the EoMPLS pseudowire will shutdown in the event of a pseudowire failure.
	• ITU Y.1731 Fault Management and Delay Management. The ITU-T Y.1731 feature provides OAM functions for fault management and performance monitoring functionality for service providers in a large network. ITY Y.1731 includes Ethernet Alarm Indication Signal (ETH-AIS), Ethernet Remote Defect Indication (ETH-RDI), Ethernet Locked Signal (ETH-LCK) functionality for fault detection and isolation. ITU Y.1731 Delay Management (DM) provides a standard Ethernet PM function that includes measurement of Ethernet frame delay and frame delay variation.
MPLS OA&M	• IP/MPLS OA&M: LSP Ping & LSP Trace Route
	• Pseudo-Wire: Virtual Circuit Connectivity Verification (VCCV), Ping, Traceroute, Static Status Message to LDP Status Message Translation
	• MPLS-TP OA&M: GACH/GAL & MPLS-TP LSP BFD OAM
Manageability	Cisco Prime Suite is the industry's most advanced optical transport domain manager. It delivers the full power of the Cisco Carrier Packet Transport products to a customer's operation personnel and back office systems alike.
	• A carrier-class Element Management System (EMS), Cisco Prime Suite: Lowers network operations, administration, maintenance, and provisioning costs
	• Provides fault, configuration, performance, and user access security management capabilities
	• Features a comprehensive client/server-based platform that scales to manage the equivalent of 3000 CPT50, CPT200, CPT600 network elements and up to 100 simultaneous user sessions
	• Offers network provisioning, surveillance, and performance monitoring features that help customers rapidly deploy and maintain revenue-generating services that are built on Cisco Optical Networking and Voice Gateway Systems
	The intelligent Cisco Prime Suite High Availability Agent is designed to automatically detect problems, attempt to restart processes, and fail over to a secondary Sun UNIX server if required.
	The Cisco Prime Suite High Availability solution:
	• Significantly reduces the risk of losing data
	• Optimizes the Cisco Prime Suite platform to provide continuous service in the event of a failure does occur
	• Helps ensure constant visibility in a customer's network
Security	Cisco Transport Software: Cisco Transport Software provides comprehensive network security features, including access control lists (ACLs); control-plane protection; authentication, authorization, and accounting (AAA) and RADIUS; Secure Shell (SSH) Protocol; SNMPv3; and Hypertext Transfer Protocol Secure (HTTPS);
	Security: Many critical security features are supported:
	• 802.1ad Layer 2 Control Protocol (L2CP) and bridge-protocol-data-unit (BPDU) filtering
	• MAC limiting per EFP or bridge domain
	• Unicast, multicast, and broadcast storm-control blocking on any interface or port
	• Unknown Unicast Flood Blocking (UUFB)
Connectivity	2x10-Gbps 802.3 Ethernet SFP+ Ports
	2x10-Gbps 802.3 Ethernet with OTN G.709 wrapping with I.4 & I.7 Enhanced FEC XFP Ports
Memory	2 GB DRAM
Environmental and Compliance Standardization	
Physical dimensions (H x W x D); Weight	13.035 x 0.975 x 10.085 in. (33.1089 x 2.4765 x 25.6159 cm)
	2.69 lbs. (1.22 kg)
Power	Max Power 210 Watts
	Nominal Power 147 Watts
Network Equipment Building Standards (NEBS)	GR-1089 Issue 5, GR-63 Issue 3
Operating temperature (nominal)	5℃ to 55℃
Operating humidity (nominal) (relative humidity)	5–85% noncondensing, operation is guaranteed up to 95% noncondensing
Storage temperature	–40℃ to 70℃

Description	Specification
Storage (relative humidity)	93% noncondensing
Operating altitude	13,123.36 feet (4000 meters)

Warranty Information

Find warranty information on Cisco.com at the Product Warranties page.

Ordering Information

To place an order, visit the Cisco Ordering Home Page. To download software, visit the Cisco Software Center.

Table 3.   Ordering Information

Product Name	Part Number
Packet Transport Fabric 256G Fabric Card with 4x10GE	CPT-PTF256-10Gx4=

Cisco Services

Cisco Services make networks, applications, and the people who use them work better together.

Today, the network is a strategic platform in a world that demands better integration between people, information, and ideas. The network works better when services, together with products, create solutions aligned with business needs and opportunities.

The unique Cisco Lifecycle approach to services defines the requisite activities at each phase of the network lifecycle to help ensure service excellence. With a collaborative delivery methodology that joins the forces of Cisco, our skilled network of partners, and our customers, we achieve the best results.

For More Information

For more information about the Cisco CPT Packet Transport Fabric and Packet Transport Module, visit www.cisco.com/en/US/products/hw/optical/ps1996/index.html for the product home page or contact your local account representative or Enter Cisco alias.