Cisco Carrier Packet Transport System

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Q. What is the Cisco® Carrier Packet Transport (CPT) System and for who is it designed?

A. The Cisco Carrier Packet Transport (CPT) System is a packet-optical transport system (P-OTS) that lays the foundation for the next-generation transport network. The Cisco CPT System comes in two models: the Cisco CPT 200 (with two service slots) with a 160-GB switch capacity and the Cisco CPT 600 (with six service slots) with a 480-GB switch capacity. In addition, the Cisco CPT 50, which is a satellite shelf, can be combined with the Cisco CPT 200 or 600 to create a platform that behaves as one integrated system, allowing flexible and cost-effective port expansion. The Cisco CPT System is designed to support transport applications so that service providers can continue to offer existing transport services while enabling new high-growth packet services.

Q. What are the technologies and components of the Cisco CPT System?

A. The main components of the Cisco CPT System product family are packet transport line cards for Gigabit Ethernet and 10 Gigabit Ethernet packet-optical transport along with Multiprotocol Label Switching-Transport Profile (MPLS-TP), integrated with dense wavelength-division multiplexing (DWDM), optical transport network (OTN), and Ethernet technologies.

Q. Why is the Cisco CPT System being announced now?

A. The market today is shifting, with service providers migrating from their existing time-division multiplexing (TDM) networks to packet transport networks. The Cisco CPT System is designed to help service providers make this transition smoothly and efficiently. Packet traffic is dominating the overall network traffic, and service providers need next-generation transport networks that can enable and support new mesh, multipoint, and multidirectional services.

Q. How is the Cisco CPT System different from competing products?

A. The primary competitors for the Cisco CPT System are traditional transport vendors. Most of these vendors' products are focused on Layer 0 (DWDM) and Layer 1 (TDM and OTN) support. While some of these vendors have integrated some basic Ethernet functions into their platforms – for example, IEEE 802.1Q-in-Q and Ethernet over SONET and Ethernet over Synchronous Digital Hierarchy (SDH) point-to-point solutions – they still lack other essential features such as Provider Bridging, Virtual Private LAN Services (VPLS), multipoint Ethernet services, and Ethernet link aggregation, which are all very important for addressing dynamic packet services. Additionally, these competing platforms are not currently designed to support features like MPLS-TP that are critical for packet transport networks. Cisco has a rich history of leadership in MPLS that the transport vendors do not.

Q. How is the Cisco CPT System positioned relative to the Cisco ONS 15454 Multiservice Transport Platform (MSTP)? Does the introduction of the Cisco CPT System imply that the Cisco ONS 15454 will be entering the end-of-life cycle?

A. The Cisco CPT System complements the Cisco ONS 15454. The Cisco CPT System is an integrated packet transport platform that allows service providers to deploy new packet transport networks. The Cisco CPT System can also be deployed to introduce new packet capabilities in existing DWDM networks that may be using the Cisco ONS 15454. The Cisco ONS 15454 continues to be the best-in-class reconfigurable optical add-drop multiplexer (ROADM) for metro-edge and long-haul DWDM applications.

Q. Do the Cisco CPT 200 and 600 use the same chassis as the Cisco ONS 15454 M2 and M6 MSTPs?

A. The Cisco CPT System does use the Cisco ONS 15454 M2 and M6 chassis, but the switch fabric and the overall architecture is completely different. While the Cisco ONS 15454 M2 and M6 chassis will remain primarily MSTP platforms for metro-edge and long-haul DWDM applications, the Cisco CPT System is focused on packet transport applications and supports new features such as MPLS-TP.

Q. When will the Cisco CPT System be generally available?

A. The Cisco CPT System is scheduled for general availability in Q1CY11.

Q. What line cards are being introduced for the Cisco CPT System?

A. The following new line cards are being introduced on the Cisco CPT 200 and CPT 600:

- Packet Transport Fabric card
  - Two ports of 10 Gigabit Ethernet using Small Form-Factor Pluggable Plus (SFP+) optics
  - Two ports of 10 Gigabit Ethernet, optical transport channel unit 2 (OTU2) and DWDM capable, using 10 Gigabit Small Form Factor Pluggable (XFP) optics
- Packet Transport Module
  - Four ports of 10 Gigabit Ethernet using SFP+ optics
- Common cards
  - Enhanced transport node controller
  - Enhanced transport shelf controller

The node requires at least one control card. The second or redundant control card can be used for very high-availability requirements.

Q. How are the Cisco CPT 50, 200, and 600 positioned relative to one another?

A. The Cisco CPT 50 serves as the access device aggregating Gigabit Ethernet and subrate Gigabit Ethernet services with 10 Gigabit Ethernet or multiple 10 Gigabit Ethernet uplinks to the Packet Transport Module in the Cisco CPT 200 or 600. Given the higher capacity of the Cisco CPT 600 compared to the Cisco CPT 200, we expect the Cisco CPT 200 to be used more often at the metro edge, and the Cisco CPT 600 to be used more often in the metro core, but both are applicable in either scenario.

Q. Are the existing Ethernet crossponder cards in the Cisco ONS 15454 compatible with the Cisco CPT System product family?

A. The existing Cisco ONS 15454 Ethernet crossponder cards will continue to be supported in the Cisco ONS 15454 M2 and M6 chassis. They are not compatible with the Cisco CPT product family. The Cisco CPT product family supports the new Packet Transport Module and provides MPLS-TP and IP/MPLS capabilities, both of which are not supported by the existing Ethernet crossponder cards.

Q. Do the Cisco CPT 200 and 600 have a redundant fabric?

A. Both the Cisco CPT 200 and 600 can be deployed with single or dual fabric cards to provide redundancy options. The Packet Transport Fabric Card provides the switch fabric and also supports four 10 Gigabit Ethernet ports for line termination.

Q. Does the Cisco CPT System support licensing of features?

A. Yes. The Cisco CPT product family supports multiple licensing schemes when used with its line cards and satellite panels. This support will allow customers to use a pay-as-you-grow operating model using software licensing, without the need for any hardware replacement.

Q. Will the Cisco CPT product family require homologation?

A. The Cisco CPT 50, 200, and 600 upon release will be compliant with the North American and the European Union markets. Compliance in other markets will occur after the first customer shipment (FCS).

Q. Will Cisco add IP over DWDM (IPoDWDM) to the Cisco CPT product line?

A. Yes. The Cisco CPT System line cards support IPoDWDM. For instance, the Packet Transport Fabric card has two XFP-based ports that support OTN framing and tunable DWDM optics.

Q. Why is the Cisco CPT System a better solution than competing products?

A. The Cisco CPT System is based on innovations that bring together packet network flexibility with a transport operational model to meet the increased traffic and bandwidth demands of video, cloud, and mobile infrastructure:

- The industry's first, advanced MPLS-TP implementation supports not just leased lines but can also efficiently transport video and mobile traffic on any network generation.
- The Cisco CPT System reduces total cost of ownership (TCO) through its innovative distributed modular architecture, which centralizes management and allows scalable Ethernet fanout through the Cisco CPT 50 satellite shelf. The Cisco CPT 50 can be managed as part of the complete system and can be viewed as a virtual line card on the Cisco CPT 200 and 600.
- The Cisco CPT System can scale up to 480 GB in a six-rack-unit (6RU) space. No competing products can match this scale and space efficiency.
- The Cisco CPT System is a service-rich platform that provides architectural flexibility with support for MPLS-TP, IP/MPLS, and Carrier Ethernet transport, giving customers data-plane and control-plane flexibility in network deployments. The Cisco CPT platform offers new revenue opportunities for service providers by providing mobile back-haul, Ethernet services, and FTTx and TDM services for residential and business customers.
- These next-generation services can be readily deployed with low operating costs using the Cisco Premier Integrated Management Experience (PRIME) network management system (NMS) tools, which allow fast and simple network turn up, point-and-click provisioning, and operation, administration, and maintenance (OAM) features.

The Cisco CPT System is designed with individual or integrated options to provide packet switching, ROADM, and OTN switching in a packet-optical transport network, allowing the customer to reduce costs, introduce new services quickly, and increase revenue.

Q. What specific packet transport capabilities does the Cisco CPT System offer service providers?

A. The Cisco CPT System delivers a true integrated packet and transport system. Service providers can maintain traditional transport operations and continue to support existing services with connection-oriented paths, automatic protection switching (APS) with switchover of less than 50 milliseconds (ms), in-band OAM, and static provisioning. Additionally, service providers can enable new packet services using the platform's Ethernet and MPLS-TP capabilities and support point-to-point and point-to-multipoint packet services. By using features such as hierarchical quality of service (HQoS), statistical multiplexing, and dynamic bandwidth allocations, service providers can control their networks more efficiently and move from being a connectivity provider to a provider of value-added services. The Cisco CPT System provides exceptional trusted transport, outstanding cost savings, and a uniquely agile platform for delivering packet transport services.

Cisco CPT 600

Q. What are the specifications of the Cisco CPT 600?

A. The Cisco CPT 600 is a 6RU chassis that offers six service slots that can be configured with:

- One or two Packet Transport Fabric cards

- One to four Packet Transport Modules

The total switch capacity of the Cisco CPT 600 is 480 GB, and the Cisco CPT 600 can initially support up to eight Cisco CPT 50 satellite shelves.

Q. Is the Cisco CPT 600 a modular platform? If so, what options are available?

A. The Cisco CPT 600 is a fully modular platform offering redundant AC or DC power options, field-replaceable fan tray, LCD and power modules, and hot-swappable control and line cards.

Q. What are the environmental and operational metrics for the Cisco CPT 600?

A. The Cisco CPT 600 is a global platform that meets all the standard environmental and operational transport requirements.

- All physical connections are on the front.
- The Cisco CPT 600 is less than 11.8-inches (30 cm) deep and can fit in 19-, 21-, or 23-inch (48, 53, 54 cm) racks.
- The Cisco CPT 600 is 6RU high.
- The Cisco CPT 600 can support Synchronous Ethernet (SyncE) and IEEE1588v2 Precision Time Protocol (PTP) timing and synchronization schemes.
- The operating temperature range is 32 to 131°F (0 to 55°C). The Cisco CPT 600 meets all relevant Telcordia, European Union, and global regulatory requirements.

Cisco CPT 200

Q. What are the specifications of the Cisco CPT 200?

A. The Cisco CPT 200 is a 2RU chassis that offers two service slots that can be configured with:

- One or two Packet Transport Fabric cards
- Zero or one Packet Transport Module

The total switch capacity of the Cisco CPT 200 is 160 GB, and the Cisco CPT 200 can initially support up to eight Cisco CPT 50 satellite shelves.

Q. What are the environmental and operational metrics for the Cisco CPT 200?

A. The Cisco CPT 200 is a global platform that meets all the standard environmental and operational transport requirements.

- All physical connections are on the front.
- The Cisco CPT 200 is less than 11.8-inches (30 cm) deep and can fit in 19-, 21-, or 23-inch (48, 53, 54 cm) racks.
- The Cisco CPT 200 is 2RU high.
- The Cisco CPT 200 can support SyncE and IEEE1588v2 PTP timing and synchronization schemes.
- The operating temperature range is 32 to 131°F (0 to 55°C).

The Cisco CPT 200 meets all relevant Telcordia, European Union, and global regulatory requirements.

Q. Is the Cisco CPT 200 a modular platform? If so, what options are available?

A. The Cisco CPT 200 is a modular platform offering AC or DC power options, with the DC option capable of connecting A and B redundant feeds. The Cisco CPT 200 does not offer power redundancy as an option. The fan tray is field replaceable. The control and line cards are hot swappable.

Cisco CPT 50

Q. What is the new Cisco CPT 50 satellite shelf? How does it fit in the overall Cisco CPT System portfolio?

A. The Cisco CPT 50 is a satellite shelf that complements either the Cisco CPT 200 or 600. The satellite architecture enables very flexible and cost-effective port expansion. You can deploy the satellite locally with the Cisco CPT 200 or 600, or remotely: up to 49 miles (80 km) from the main chassis. In either case, it is managed as part of the same node, effectively as a virtual line card.

Q. What are the specifications of the Cisco CPT 50?

A. The Cisco CPT 50 is a fixed-configuration 1RU platform with 44 Gigabit Ethernet ports and four 10 Gigabit Ethernet uplink ports.

Q. Is the Cisco CPT 50 a modular platform? If so, what options are available?

A. The Cisco CPT 50 offers a redundant DC or a single AC power option and has field-replaceable fan trays.

Q. How will Cisco CPT 50 be positioned relative to the Cisco CPT 200 and 600?

A. The Cisco CPT 50 serves as the access or preaggregation device aggregating line-rate or subrate 100- and 1000-Mbps services with 10 Gigabit Ethernet or multiple 10 Gigabit Ethernet uplinks to the packet transport modules in Cisco CPT 200 or 600.

Q. What are the environmental and operational metrics for the Cisco CPT 50?

A. The Cisco CPT 50 is a global platform that meets all the standard environmental and operational transport requirements.

- All physical connections are on the front.
- The Cisco CPT 50 is less than 11.8-inches (30 cm) deep and can fit in 19-, 21-, or 23-inch (48, 53, 54 cm) racks.
- The Cisco CPT 50 is 1RU high.
- The Cisco CPT 50 can support SyncE and IEEE1588v2 PTP timing and synchronization schemes.
- The operating temperature range is (-40 to 149℉) – 40 to 65℃.
- The Cisco CPT 50 meets all relevant Telcordia, European Union, and global regulatory requirements.

General Questions

Q. What is Multiprotocol Label Switching Transport Profile (MPLS-TP)?

A. MPLS-TP is a set of MPLS protocols that IETF is defining to enable traditional MPLS technology to be used in a simplified version for transport networks.

Q. What is Cisco's role in defining the MPLS-TP standard?

A. Cisco is an active and leading member of the IETF, which is the organization tasked by the industry with developing the protocol and capabilities for MPLS-TP. Cisco is the recognized leader in the market for IP/MPLS solutions and has a 15-year history of leading MPLS technology innovation.

Q. When is MPLS-TP expected to be available on the Cisco CPT platform? Will it be supported in other Cisco platforms?

A. MPLS-TP will first be available on the Cisco CPT product family in Q1CY11. It will also be supported on the Cisco ME 3600X Series Ethernet Access Switches, Cisco ME 3800X Series Carrier Ethernet Switch Routers, Cisco 7600 Series Routers, and Cisco ASR 9000 Series Aggregation Services Routers.

Q. Why is MPLS-TP the technology that service providers have chosen for packet transport networks?

A. MPLS-TP is a leading connection-oriented packet technology. MPLS-TP provides transport networks the same look and feel that they have traditionally employed: static and connection-oriented path provisioning, in-band OAM, and automatic protection switching in less than 50 ms. MPLS-TP is a subset of IP/MPLS, which is a

proven and mature, globally deployed packet technology in the aggregation, edge, and core layers of data networks. Building on that technology makes logical sense. The capability to extend standards-based MPLS to the access and aggregation portions of the network introduces packet technology for a converged network with a single control plane and single forwarding mechanism.

Q. Does the Cisco CPT System conflict with the Cisco Carrier Ethernet transport solution?

A. No. The Cisco CPT System is designed for applications for which customers want an integrated packet transport and Ethernet solution: for example, DWDM and Ethernet. The Cisco ME Family of switches provides dedicated Carrier Ethernet solutions.

Q. Can MPLS-TP be used as a technology for the core of the network?

A. MPLS-TP has significant value in the access layer. It allows customers to use packet services while retaining some of the main attributes of TDM access networks. Since the nature of the traffic is point to point from the customer to the edge, MPLS-TP works well in this area. For the core, given the variability in demand and the multidimensional traffic matrix, regular MPLS or dynamic MPLS is the right technology.

Q. How can Cisco claim to be the first P-OTS platform in the market?

A. While many vendors have spoken about P-OTS and continue to claim to have a P-OTS platform, no one has yet shown a single platform that supports DWDM, OTN, Ethernet, and MPLS-TP. Many of the traditional transport vendors have implemented integrated DWDM and OTN platforms, but they have yet to show a true integrated packet platform demonstrating Ethernet and MPLS-TP.

Q. What is the difference between MPLS-TP and T-MPLS and the packet transport network (PTN) solution being sold by Huawei and ALU? Why is Cisco developing MPLS-TP?

A. MPLS-TP is the industry's technology of choice for packet transport. It is being developed in the IETF as a standards-based solution. Both the IETF and ITU-T jointly agreed that the IETF should lead the standards development effort, with the ITU-T providing the transport requirements. T-MPLS is a standard that was initially proposed by traditional transport vendors in an effort to provide a path to packet transport from existing TDM networks. Unfortunately, T-MPLS broke the basic MPLS model and was not interoperable with MPLS. When the industry agreed to support MPLS-TP, the ITU-T officially ceased to support T-MPLS.

Cisco believes that a standards-based approach allows service providers to build on and protect their existing investments in their currently deployed IP/MPLS networks. The MPLS-TP standards-based approach provides a much more operationally cost-effective solution for service providers that want to deploy packet transport networks.

Huawei and ALU continue to promote their solution, which is actually a proprietary solution built on the former T-MPLS specification. It is misleading to consider T-MPLS to be the same as MPLS-TP or standards based.

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