

DATA SHEET

Virtual Container over Packet Transceivers

OC-3 / STM-1, OC-3/12 / STM-1/4



Ciena's Virtual Container over Packet Transceivers enable cost-effective transport of OC-3/STM-1 and OC-12/STM-4 signals over Ethernet.

The Small Form-factor Pluggable (SFP) modules convert a data stream from its user SONET/SDH port into circuit-emulated packets for transmission over a Packet Switched Network (PSN). One is capable of OC-3/STM-1 rates (155 Mb/s) while the other adds OC-12/STM-4 signal rates (up to 622 Mb/s). Packets are transmitted via a 1 Gigabit Ethernet (GbE) port on the host device through one or more PSNs (in the case of multiple operators, for example). At the remote end, packets are converted back to TDM traffic for handoff as TDM services.

TDM to packet modernization

With many network operators transforming their networks to all-packet transport, TDM over packet emerges as a key enabler to efficiently migrate legacy services to the new packet-based infrastructure. Using a single unified network for both data and TDM transport can streamline operations and reduce capital and operational expenditures.

The packet-based network allows for greater economies of scale for multiple service types (video, voice, mobile, etc.) while accommodating the need to reliably carry legacy traffic from TDM interfaces, which are likely still in use in many enterprise and industrial scenarios. Whether servicing traditional PBX units, utility teleprotection relays, digitized voice equipment, or Supervisory Control and Data Acquisition (SCADA) systems, TDM end-points will remain common interfaces into the modernized network for decades to come. These services will need to be accommodated within the same infrastructure as the growing data network to remain cost-effective while not sacrificing the highest reliability these systems require.

Features and Benefits

- Incorporates STS1-SPE/VC-3, STS3c-SPE/VC-4, or STS-12c-SPE/VC-4-4c packetization function to provide a high-density gateway between a SONET/SDH network and Ethernet/MPLS networks (enterprise or business access)
- Utilizes SFP 20-pin MSA-compliant transceiver that can be inserted into select Ciena Packet Networking Family devices
- Integrates Circuit Emulation over Packet (CEP) RFC4842-compliant packetizer, reducing system and network complexity while offering lower carbon footprint for significant CAPEX and OPEX savings
- Provides intermediate reach (15km) 1310nm, single-mode fiber interface
- Delivers plug-and-play operation with CEP equipment, including those in Ciena's Pluggable Transceiver Family

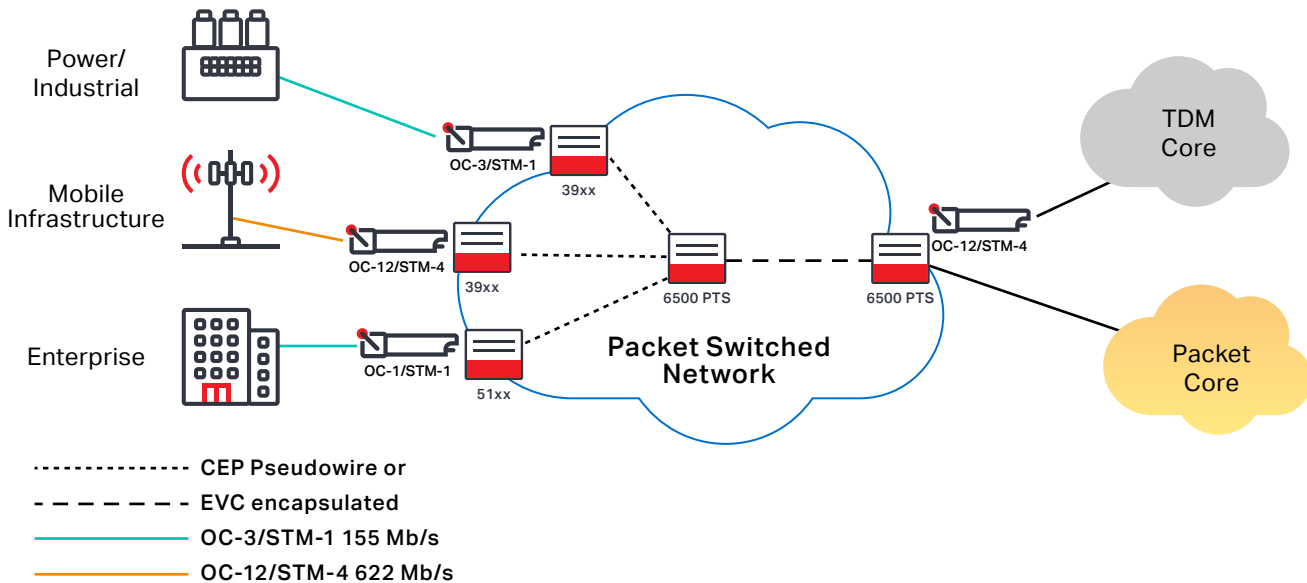


Figure 1. Aggregation of T3 to SONET/SDH

Cost-effective yet reliable TDM transport

Both modules provide LC duplex fiber interfaces using 1310nm FP laser for 15km intermediate reach via single-mode fiber. The client signal is packetized into fixed-size data blocks to be transported across an Ethernet network by using the CEP (RFC4842) protocol.

To transport SONET/SDH circuits through a packet-oriented network, the SONET/SDH payload is broken into fragments and a CEP header is prepended to each fragment. The CEP header supports Basic and Extended modes. Basic mode provides functionality necessary to accurately emulate a SONET/SDH circuit over a packet-switched network, while Extended mode headers are utilized for optional SONET/SDH fragment formats.

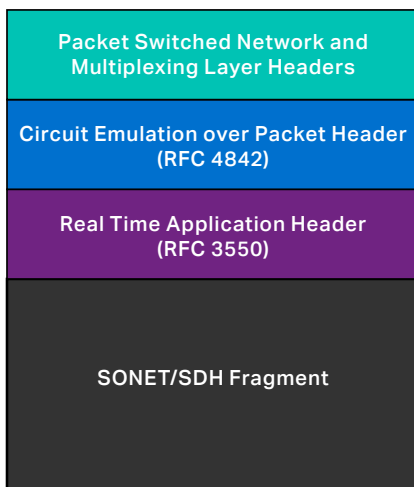


Figure 2 Basic CEP Packet

CEP: Packetizer and de-packetizer

The devices support the following functions in the direction from OC-3/12 or STM-1/4 to PSN (sender):

- SONET/SDH layers: line/section, pointer processing, and demux
- Packetize each payload envelope into fixed-size data blocks using CEP
- Encapsulate the data blocks with packet headers and FCS, which are configurable per PW channel
- Transmit packets via electrical GbE interface towards the PSN
- Ethernet physical layer frequency is recovered from the incoming optical OC-3/12 or STM-1/4

The devices support the following functions in the direction from PSN to OC-3/12 or STM-1/4 interface (receiver):

- Transport the OC-3/12 or STM-1/4 signal on the fiber interface
- Reception and validation of packets from the PSN via the electrical GbE interface
- Decap the packet streams into OC-3/12 or STM-1/4 payload streams
- Delay buffer management, packet sequencing
- Generate the appropriate payload envelope bit stream using Explicit Pointer Adjustment Relay (EPAR) clock recovery method

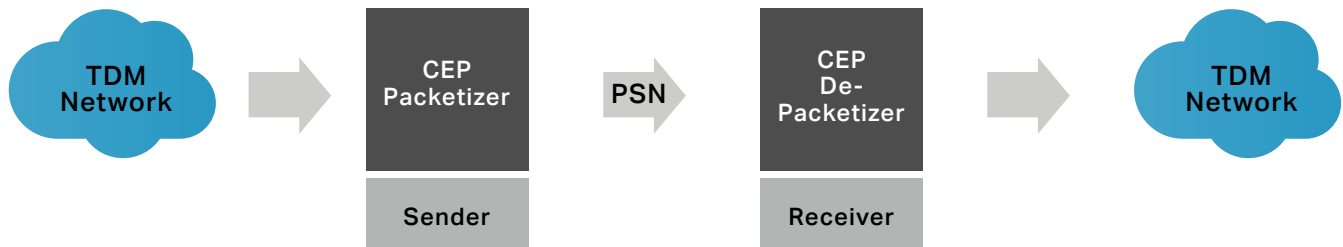


Figure 3 Sender and Receiver functions

- Frequency of outgoing optical OC-3/12 or STM-1/4 is recovered from the Ethernet physical layer frequency of the host system
- SONET OC-3/12 or STM-1/4 layer: mux, pointer processing, and line/section

Technical Information

Specifications	
Interface	OC-3/STM-1 version: STM-1/OC-3, (15 km), 1310, SM , 155 Mb/s (Optical), OC-3, single mode, intermediate reach OC-3/12 / STM-1/4 version: STM-1/OC-3, STM-4/OC-12, (15 km), 1310, SM, 622 Mb/s (Optical), OC-3/OC-12, single mode, intermediate reach
Header formats	MEF8 and MPLS frame header format with optional VLAN tag
Management and Support	Management via Service Aware Operating System (SAOS)
Host device compatibility	3904, 3905, 3926m, 3928, 3930-930, 3932, 5142, 5160
Mechanical	Conforms to SFP 20-pin Multi-Source Agreement (MSA) LC duplex connector, 1000Base-X SerDes via MSA
Physical Dimensions in Millimeters	OC-3/STM-1 version: Length= 56.50 , Width= 14.00, Height = 8.55 OC-3/12 / STM-1/4 version: Length= 56.50 , Width= 14.00, Height = 8.55
Operating temperature	OC-3/STM-1 version: -40°C to 85°C OC-3/12 / STM-1/4 version: 0°C to 70°C
Jitter	OC-3/STM-1 version: max value OC3: 8 ms per channel OC-3/12 / STM-1/4 version: max value OC12: 16 ms, per channel, OC3: 16 ms per channel

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