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## 7090-350 CEM Packet Transport Platform

*Scaling MPLS-TP Packet Transport with up to 960G  
Non-blocking Capacity and 100GE Interfaces*

The Coriant® 7090 M/CEM Packet Transport Solutions provide scalable MPLS-TP enabled packet transport addressing a wide range of applications including Layer 2 enterprise services, mobile and fixed broadband backhaul, and TDM migration, either as a standalone solution or together with other solutions in the Coriant packet optical portfolio, including the Coriant® 7100 Packet Optical Transport Solutions and the Coriant® mTera® Universal Transport Platform (UTP). In the 7090 M/CEM Series, the Coriant® 7090-350 CEM Packet Transport Platform addresses the growing demand for bandwidth driven by cloud and video with support for up to 960 Gbps non-blocking capacity in a compact 4RU shelf with up to eight 100GE interfaces.

### SCALING TO 960 GBPS IN A COMPACT 4RU SHELF

The 7090-350 CEM provides eight slots for switching modules with redundant 960 Gbps fabrics. Module options include 12xGE/10GE (SFP/SFP+), 1x100GE QSFP28, 1x100GE 30 km, and 1x100GE 60 km. Equipping all eight slots with 100GE modules enables eight 100GE interfaces. Equipping all eight slots with GE/10GE modules enables ninety-five GE/10GE interfaces. The 7090-350 CEM reduces OpEx in terms of space at only 4RU and power consumption of less than 700 W.

### BUILDING 100GE RINGS AND REDUCING ROUTER CAPEX WITH 100GE HAND-OFF

The 7090-350 CEM brings the option of 100GE interfaces to the 7090 CEM Series. The 1x100GE QSFP28 can provide client (UNI) and line (NNI) interfaces with support for SR4 (100 m) and LR4 (10 km) pluggables. The 7090-350 CEM also supports two modules with integrated line interfaces supporting 100GE to 30 km (ER10) and 60 km (ZR10) respectively.

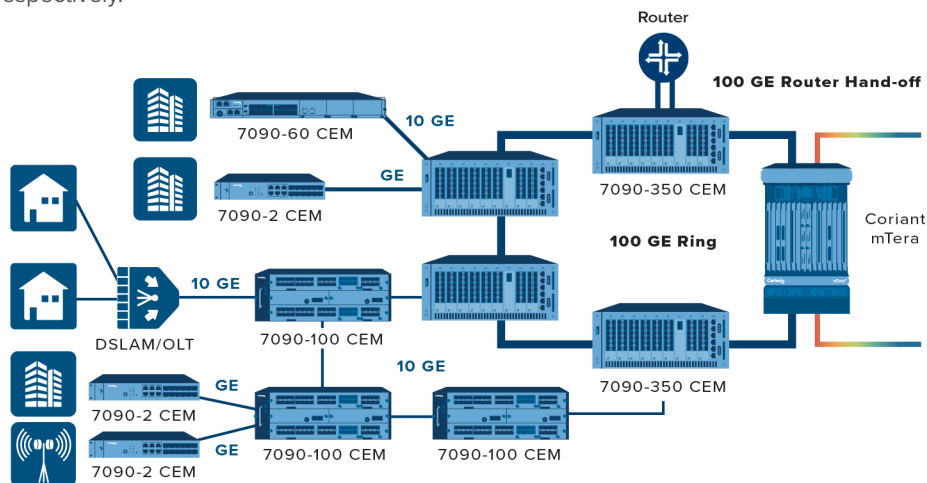


Figure 1: Coriant® 7090-350 CEM Use Cases

### BENEFITS OF THE CORIANT® 7090-350 CEM

- **Aggregate** traffic onto 100GE interfaces for router hand-off, for 100GE rings, and for 100GE mesh topologies
- **Scale** to 960G of non-blocking MPLS-TP packet switching with up to 95x10GE and up to 8x100GE
- **Minimize** space and power with a compact 4RU platform that consumes less than 0.8 W per Gbps
- **Backhaul** mobile traffic including LTE-TDD and LTE-Advanced with comprehensive synchronization support including Synchronous Ethernet and 1588v2 boundary clock
- **Maximize** Ethernet service revenues with comprehensive quality of service and network protection capabilities



Use cases for the 100GE interfaces include 100GE rings, 100GE mesh, and the aggregation of traffic onto 100GE interfaces for hand-off to edge routers. Aggregating traffic from multiple locations onto a smaller number of high speed router ports maximizes the utilization of router slots and ports, which can result in significant router CapEx savings.

## **DELIVERING A WIDE RANGE OF SERVICES WITH COMPREHENSIVE MPLS-TP SUPPORT**

MPLS-TP provides a scalable, transport-oriented option for packet switching. Comprehensive MPLS-TP support includes static LSPs, single segment and multi-segment pseudowires, Virtual Private LAN Service (VPLS), and Hierarchical Virtual Private LAN Service (H-VPLS). MPLS-TP OAM includes G.8113.1 and G.8113.2. Additional Ethernet OAM capabilities include Y.1731 and 802.3 Link OAM. MPLS-TP protection features include 1:1 LSP protection, LSP SNC, MPLS-TP ring protection, MPLS-TP dual homing and dual star protection, and both 1:1 single segment and 1:1 multi-segment pseudowire protection.

## **MAXIMIZING ETHERNET SERVICE REVENUES WITH HARD QUALITY OF SERVICE AND A RANGE OF HIGH AVAILABILITY FEATURES**

The 7090-350 CEM provides an MEF CE 2.0 compliant platform with support for Ethernet connectivity services including E-Line, E-LAN, E-Tree, and E-Access. Quality of service mechanisms include Layer 2 and Layer 3 classification, policing, and shaping. The 7090-350 CEM supports eight service levels with strict priority and deficit weighted round robin scheduling algorithms. Hierarchical QoS is supported for pseudowires and LSPs. Unintentional overbooking is prevented by Connection Admission Control (CAC) in the network management system enabling hard QoS. In addition to the MPLS-TP protection mechanisms described previously, the 7090-350 CEM supports 802.1AX Link Aggregation on both client (UNI) and network (NNI) interfaces including multi-chassis LAG on the client (UNI) side. These network protection mechanisms, together with equipment protection including redundant fabric/controller/timing modules, fans, and power, ensure maximum service availability.

## **FUTURE-PROOFING MOBILE BACKHAUL WITH COMPREHENSIVE SYNCHRONIZATION SUPPORT**

With comprehensive support for both frequency and phase synchronization, the 7090-350 CEM provides an ideal solution for mobile backhaul, including LTE-TDD and LTE-Advanced functions such as Coordinated Multipoint (CoMP), Enhanced Inter-cell Interference Coordination (eICIC), and Multiple-input Multiple-output (MIMO). The 7090-350 CEM supports both frequency and phase synchronization over packet. Options for frequency synchronization include Synchronous Ethernet, 1588v2 frequency profile, and a hybrid option that combines Synchronous Ethernet and 1588v2. Additional 1588v2 phase/frequency synchronization options include boundary clock, transparent clock, and ordinary clock. The 7090-350 CEM also provides external clock interfaces with support for 2 MHz and 2 Mbps (G.703) and 1PPS+ToD.

## **REDUCING OPEX WITH POWERFUL END-TO-END PACKET MANAGEMENT**

The Coriant Transcend™ Transport Network Management System (TNMS) provides comprehensive end-to-end network management for the 7090 M/CEM Series and the other platforms within the Coriant packet optical transport portfolio, including the 7100 Series and mTera UTP. Key features include network inventory, capacity management, advanced troubleshooting, performance monitoring, service provisioning and supervision, and service and subscriber management. Open APIs enable end-to-end orchestration including a REST API (Presto) enabling support for the MEF's Lifecycle Service Orchestration (LSO). A local craft station option, the Coriant® 7090 LCT NE Management System, is also available.

## TECHNICAL SPECIFICATIONS

### Physical

- 4RU
- 178 mm H x 442 mm W x 490 mm D
- Eight front slots for interface modules
  - Slots 1-7: Up to 120 Gbps
  - Slot 8: Up to 110 Gbps
- One front slot for Management I/O Module
- Two front half slots for Power Supply Units
- Two rear slots for 960 Gbps Fabric/Controller/Timing Modules
- Three rear slots for fans
- DC power: -48V
- Maximum Power Consumption: < 700 W

### Interface Modules

- 12x10GE/GE SFP+/SFP
- 1x100GE QSFP28 (UNI/NNI)
- 1x100GE 30 km (NNI)
- 1x100GE 60 km (NNI)

### MPLS-TP

- Static LSPs
- Static Single Segment (SS) pseudowires
- Static Multi-Segment (MS) pseudowires
- VPLS/H-VPLS

### OAM

- MPLS-TP OAM (G.8113.1/G.8113.2)
- ITU-T Y.1731 End-to-end Performance Monitoring and AIS
- 802.3 Link OAM
- Hardware-based delay and loopback measurement with nanosecond resolution

### Network Protection

- LSP 1:1 linear protection
- LSP SNC protection

- LSP ring protection
- Single Segment (SS) pseudowire 1:1 protection
- Multi-Segment (MS) pseudowire 1:1 protection
- Dual Homing/Dual Star
- 802.1AX Link Aggregation with LACP (UNI/NNI)
- 1:1 Multi-chassis LAG with LACP (UNI)
- RSTP (IEEE 802.1Q)
- Link Pass-Through (LPT)

### Equipment Protection

- Fabric/Controller/Timing (1+1)
- Power Supply Units (1+1)
- Fans (2:1)

### Quality of Service and

#### Traffic Management

- L2 Classification: VLAN, PRI, MAC address, TPID
- L3 Classification: IP address, DSCP, port number, TOS
- Connection Admission Control (CAC)
- Policing (CIR, CBS, EIR, and EBS; Color-Blind Mode and Color-Aware Mode)
- Shaping
- Congestion Avoidance: WRED
- 8 Service Classes
- Scheduling: SP, DWRR, SP+DWRR

### Timing and Synchronization

- Synchronous Ethernet (G.8261, G.8262)
- IEEE 1588v2:
  - Boundary Clock, Transparent Clock, Ordinary Clock (G.8275.1)
  - Frequency Profile (G.8265.1)
- External Clock Interfaces: 2 MHz and 2 Mbps (G.703), 1 Pulse-per-Second (PPS) + Time-of-Day (TOD)

### Ethernet Functions

- MEF CE 2.0 Compliant
- E-Line, E-LAN, E-Tree, E-Access
- VLAN (IEEE 802.1Q)
- Q-in-Q (IEEE 802.1ad)
- 9600 bytes jumbo frame
- VLAN manipulation: stack/switch/strip
- Flow control (IEEE 802.3x)
- IGMP snooping (V1/V2/V3)

### TDM CES Interfaces

- Smart SFPs: E1, T1, DS3, STM-1/OC-3, STM-4/OC-12, STM-16/OC-48
- RFC 4553 Structure-Agnostic TDM over Packet (SAToP)
- Transparent SONET/SDH over Packet (TSoP)

### Management

- Coriant Transcend™ Transport Network Management System (TNMS)
- Coriant® 7090 LCT NE Management System
- Management I/O Module (Ports: 1xNMS+2xClock+2xAlarm)
- In-band and out-band management
- OSPF Layer 3 DCN
- SFTP
- SSHv2

### Environment and Climate

- ETSI 300 019
- Operating temperature: -5°C to +50°C
- Humidity: 5%-90%
- ETSI EN 300 386 V1.6.1/EN 55022(2010)
- EN 60950-1: 2006+A11: 2009+A1:2010+A12:2011

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