

# CM-4000 Carrier Ethernet + Transport (CE+T) Solution

## A Carrier-Class Packet Transport Network (PTN) Solution

Orckit-Corrigent's CM-4000 Packet Transport Network (PTN) switches lead the way in next generation transport networks that enable legacy SDH and PDH, Carrier Ethernet and Mobile Backhaul services.

CM-4000 is a family of dual stack MPLS and MPLS-TP PTN switches with wide set of transport features providing high service availability and scalability, together with end-to-end "point-and-click" management via its service and application-oriented CM-View NMS.

With CM-4000, telecommunication service providers can benefit from a high-capacity, cost-effective aggregation solution for future proof SDH migration to packet, Carrier Ethernet applications including residential triple-play and enterprise VPN connectivity services, and packet based mobile backhauling.

The CM-4000 provides easy migration from TDM to packet networks by seamlessly supporting any type and interface of low rate PDH and high rate SDH services over standard and interoperable MPLS- and MPLS-TP based PTN.

By cost-effectively enabling any mixture of SDH, PDH and Ethernet traffic, the CM-4000 secures the investment, subscribers and services in the legacy access network and provides a phased migration in the metro aggregation network.

Orckit-Corrigent's CM-4000 product line includes the CM-4314 and CM-4206 metro aggregation PTN switches, which provide fully non-blocking switching capacity of full-duplex 320 Gbps and 160 Gbps, in-service scalable to 640 and 320 Gbps, respectively. The product line can be deployed in any configuration, including ring, mesh and tree topologies over 10GE, GE and STM-1/4/16 interfaces.

Orckit-Corrigent is uniquely positioned to address providers' needs for next-generation Packet Transport Networks.

### Services and Applications

Orckit-Corrigent's CM-4000 offers a unique and optimal solution for providing SDH migration, Carrier Ethernet residential triple play and enterprise VPN, as well as Mobile Backhaul services over a converged platform.



Equipped with application and service-aware capabilities, video-aware Call Admission Control (CAC), and enhanced inherent traffic management capabilities guaranteeing end-to-end performance during congestion and protection events and enabling dynamic bandwidth reclamation and optimal bandwidth utilization at all times, The CM-4000 is dual stack MPLS and MPLS-TP based PTN solution for the delivery of the following services:

- Network convergence of new Ethernet-based and legacy TDM services
- Any TDM private-line services, from PDH E1/E3 till SDH STM-1/4/16
- E-Line, E-LAN and E-Tree services with differentiated QoS, application classification and SLA assurance
- Application-aware delivery of content-rich multi-Play residential services
- Packet based mobile backhauling services

These services enable the delivery of end-user applications such as Multi-Play (VoIP, broadcast video, VoD, shifted TV, nPVR, HSI), Enterprise VPN, and mobile backhaul services, and on-demand content distribution.

The CM-4000 also facilitates the migration towards packet transport network by providing a viable path to convergence through the introduction of timing, synchronization, and circuit emulation technologies, that enable smooth TDM migration to PTN.

## Technical Specifications

### CM-4314 General Specifications

- 14 user slots, 100G ready
- 320Gbps full-duplex, scalable to 1Tbps, fully redundant
- Dimensions: 16RU in 300mm ETSI and 19" rack
- W: 19" (483 mm), H: 28" (711 mm), D: 11.2" (285 mm)

### CM-4206 General Specifications

- 6 user slots
- 160Gbps full-duplex, scalable to 320Gbps, fully redundant
- Dimensions: 8RU in 300mm ETSI and 19" rack
- W: 19" (483 mm), H: 14" (356 mm), D: 11.2" (285 mm)

### Universal Interface Modules (UIM)

- 2-port 10 Gigabit Ethernet (XFP)
- 20-port Gigabit Ethernet (SFP)
- 16-port STM-1/4/16, CEP (SFP)
- 8-port STM-1, 2 port STM-4, SAToP (SFP)

### Power Specification

- Input voltage (range) -40 to -72 VDC
- Power Consumption (max): CM-4314 - 2200W, CM-4206 - 1100W

### Applications

- SDH migration to packet transport network
- Carrier Ethernet metro aggregation
- Enterprise VPN
- Mobile backhauling
- Residential triple-play, including IPTV, VoD, VoIP, HSI

### Services

- E-Line, E-LAN, E-Tree services
- Virtual Private LAN Services (VPLS)
- Virtual Private Wire Services (VPWS)
- MEF certified
- SDH private line: VC-12/3/4-nc circuits over packet (CEP)
- SAToP services on channelized STM-1/4
- Ethernet over SDH (EoS) to native Ethernet interworking

### Ethernet Functionality

- Ethernet protocol (IEEE 802.3)
- Ethernet MAC learning, forwarding and flooding
  - Unicast
  - Multicast
  - Broadcast
- Ethernet static MAC configuration
- VLAN Manipulations: no change (transparent) / change (translate) / trunk (stack)
- Ethernet provider bridging (IEEE 802.1Q, 802.1ad)
- Link aggregation (IEEE 802.3ad)

### Dual stack MPLS and MPLS-TP Functionality

- IETF PWE3 encapsulation
- Label swap, push, pop
- DiffServ: E-LSP, L-LSP
- RSVP-TE
- LDP
- MPLS-TP LSP static provisioning
- Multi-Segment PW (MS-PW)

### SDH Functionality

- LO and HO SDH cross connect and grooming
- EoS (GFP, VCAT) termination and interworking with native Ethernet
- DCC cross connect for RS, MS, RS+MS channels
- SDH OAM

### Routing

- ISIS-TE routing protocol
- OSPF-TE routing protocol
- CSPF routing
- Static routing

### OAM

- Ethernet OAM (IEEE 802.1ag and ITU-T Y.1731)
- MPLS OAM (LSP Ping, LSP Trace-route)
- MPLS-TP OAM (CC/AIS/RDI/LB/LT)
- Bidirectional Forwarding Detection (BFD)

### Protection

- MPLS Fast Reroute (FRR)
- MPLS end-to-end LSP protection
- MPLS dual-homed tunnel protection
- MPLS-TP 1:1 linear LSP protection
- MPLS-TP dual-homed PW protection
- Ethernet IEEE 802.3ad Ethernet Link Aggregation (LAG)
- Ethernet Ring Protection (ERP, ITU-T G.8032)
- RPR steer protection (IEEE 802.17)
- SDH MSP 1+1 linear protection
- SDH SNCP
- SDH Dual Node Interconnect (DNI)
- Equipment protection
  - Power, controller and fabric protection
  - Hot-swappable modules

### Timing and synchronization

- Synchronous Ethernet (ITU-T G.8261) on 10GE, GE interfaces
- IEEE 1588v2 master / slave / boundary clock
- 2 BITS in/out: 2Mbps, 2MHz, 64Kbps composite clock
- Internal Stratum 3E clock (holdover state)
- Primary and secondary sources (supports SSM bits)
- SDH sync on STM-n interfaces
- ACR, DCR, loop timing on SAToP

### Traffic Management

- Traffic Classification based on:
  - Port, VLAN, Port+VLAN
  - IEEE 802.1p
  - IPv4 TOS and DSCP
- Network wide Call Admission Control (CAC)
- Classes of Service (CoS): 8 classes of services with strict priority (SP) and Weighted Fair Queuing (WFQ) scheduling algorithms, supporting, Best Effort, Guaranteed bandwidth, delay/jitter sensitive and TDM traffic

### Multicast Functionality

- IGMP snooping
- IGMP proxy
- MLD
- MVR

### Management

- CM-View NMS
  - Service oriented NMS, point-and-click GUI
  - Full FCAPS support
  - Bi-directional A-Z provisioning (tunnel and LSP)
  - Physical + logical + service trees
  - Multiple partition views
  - Unified NMS for MPLS and MPLS-TP
  - VPLS on graphical map
  - Northbound APIs for external OSSs
  - CORBA, SNMPv2/v3
  - TMF 814
- TL1
- SNMPv2/v3

### Security

- Access Control List (ACL)
- TACACS+
- SSH

### Environmental Specifications

- Operating temperature range: 23 - 131°F (-5 to +55°C)
- Operating humidity range: 5 - 85% RH (non-condensing) at 104°F (40°C)
- Altitude: 13125 feet (4000 meters) maximum
- Storage temperature range: -40 to +158°F (-40 to +70°C)
- Storage humidity: 93% RH (non-condensing) maximum

### Regulatory Approval

- CE and UL
- Operating conditions: ETSI 300 019, class 3.1
- Storage conditions: ETSI 300 019, class 3.1
- Transportation conditions: ETSI 300 019, class 3.1
- EMC: EN 300 386, EN55022, FCC, VCCI
- NEBS Level 3: Telecordia GR-1089-CORE, Telecordia GR-63-CORE
- Safety: UL60950, EN60950, IEC60950



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