

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

A Carrier-Class Solution

Orckit-Corrigent's CM-4000 Carrier Ethernet + Transport (CE+T) switches lead the way in next generation Carrier Ethernet equipment.

CM-4000 is a family of MPLS-based Carrier Ethernet 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, providers can benefit from a high-capacity, cost-effective aggregation solution for residential multi-play applications, a highly-reliable Carrier Ethernet service offering for small and medium-size business customers, and a flexible service enabling them to address the diverse requirements of their enterprise customers.

The CM-4000 also provides easy migration from TDM to Ethernet networks by seamlessly supporting SONET/SDH grooming, cross-connect and transport services, as well as Layer 2 interworking function.

By cost-effectively enabling any mixture of SONET/SDH and Ethernet traffic, the CM-4000 secures the investment and provides the service provider with an agile platform enabling the deployment of advanced residential multi-play and business services as well as gradual adaptation and migration of legacy services over the same infrastructure.

Orckit-Corrigent's CM-4000 product line includes the CM-4314 and CM-4206 systems, 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 one or multiple 10 Gbps wavelengths.

Orckit-Corrigent is uniquely positioned to address providers' needs for next-generation Carrier Ethernet networks.

Services and Applications

Orckit-Corrigent's CM-4000 offers a unique and optimal solution for providing both residential and business services over a converged platform.



Equipped with application and service-aware capabilities, video-aware Call Admission Control (CAC), and enhanced inherent traffic management module 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 the solution of choice for the delivery of the following services:

- Application-aware delivery of content-rich Multi-Play residential services
- E-Line, E-LAN and E-Tree services with differentiated QoS, application classification and SLA assurance
- Network convergence of new Ethernet-based and legacy TDM services
- The full range of SONET/SDH private line services for carriers and international operators
- Non-blocking SONET/SDH low-order and high-order cross connects

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

The CM-4000 also facilitates the migration towards all-IP by providing a viable path to convergence through the introduction of SONET/SDH-to-Ethernet interworking.

CM-4314 Mechanical Specifications

- 14 user slots
- 320 Gbps redundant switching fabric, in-service scalable to 640 Gbps
- Dimensions: (16RU)
- W: 19" (483 mm), H: 28" (711 mm), D: 11.2" (285 mm)

CM-4206 Mechanical Specifications

- 6 user slots
- 160 Gbps protected switching fabrics scalable to 320 Gbps
- Dimensions: (8RU)
- W: 19" (483 mm), H: 14" (356 mm), D: 11.2" (285 mm)

Power Specification

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

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

Universal Interface Modules (UIM)

- 2-port 10 Gigabit Ethernet (XFP)
- 20-port Gigabit Ethernet (SFP)
- 24-port Fast Ethernet 10/100 BaseT/FX
- 1-port 40 Gigabit Ethernet
- 1-port OC-192 (XFP)
- 16-port OC-3/12/48 or STM-1/4/16 (VT-1.5/VC-11 and VC-12 channelization, transmuxing)

Services

- Ethernet E-Line service
- Ethernet E-LAN service
- Ethernet E-Tree service
- Ethernet-based broadcast/multicast service
- TDM private line service
- VT-1.5/VC-11, VT-2/VC-12 and STS-1/VC-3/VC-4 level non-blocking cross-connects
- Ethernet over SONET (EoS) to native Ethernet interworking
- IP/PPP/SONET to IP/Ethernet interworking

Applications

- Application-aware delivery of content-rich multi-play residential services
- E-Line, E-LAN business services with differentiated QoS, application classification and SLA assurance
- Network convergence of new packet based services with legacy TDM services

Application Aware Traffic Management

- Video-aware Call Admission Control (CAC) for BCTV and VOD
- Classes of Service (CoS): 5 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
- Application classes: 3 classes per CoS to separate between different application groups within the same CoS.

Routing

- OSPF routing protocol
- Multiple OSPF instances (one per VRF)
- OSPF graceful restart
- Static routing

MPLS Functionality

- IETF PWE3 encapsulation
- MPLS label swap, push, pop
- MPLS DiffServ: E-LSP, L-LSP
- LDP
- RSVP-TE
- PWE3 OAM (VCCV)
- MPLS OAM (LSP Ping, LSP Trace-route, BFD)

A 3M Company



Ethernet Functionality

- Ethernet protocol (IEEE 802.3)
- Ethernet MAC static configuration
- Ethernet MAC access control list (ACL) management
- VLAN manipulation/trunk
- Virtual Private LAN Services (VPLS) with 802.1Q
- Interworking with Ethernet bridging (802.1D) and virtual bridging (802.1Q)
- Ethernet provider bridging (802.1ad)
- Link aggregation (IEEE 802.3ad)
- Ethernet OAM (IEEE 802.1ag and ITU-T Y.1731)
- Ethernet Traffic Classification
 - Port
 - Ethernet MAC
 - Ethernet VLAN
 - EtherType
 - IEEE 802.1p
 - IPv4 ToS and DSCP
 - IPv6 Traffic Class and DSCP
 - IP protocol
- Ethernet Forwarding Criteria
 - MAC
 - MAC + VLAN
 - Unicast traffic
 - Multicast traffic
 - Broadcast traffic

Resilient Packet Ring (IEEE 802.17 RPR)

- Ring-wide weighted fairness
- Dual transit queue
- Loss-less shared media

SONET/SDH Functionality

- LO and HO SONET/SDH Cross-connect functions
- SONET to SDH Interworking
- SONET/SDH and PDH to Ethernet Layer 2 Interworking:
 - IP/PPP and MPLS
 - IP/HDLC
- SONET/SDH OAM

Multicast Functionality

- IGMP snooping
- IGMP proxy
- MLD

Protection

- Ethernet network protection:
 - IEEE 802.3ad Ethernet Link Aggregation
 - 1:1 Link protection
- Resilient Packet Ring (RPR) sub-50 ms Protection (per service):
 - Wrap
 - Steer
 - Selective Wrap, Independent Steer (SWIS)
- MPLS end-to-end LSP protection
- MPLS PW protection
- SONET/SDH 1+1 linear protection
- Equipment protection:
 - power, controller and fabric protection
 - 1:1, 1:N, 1+1 electrical and optical interface protection
 - Hot-swappable interface cards
 - Hitless switchover
- Dual homing and dual node interconnection

Timing and synchronization

- Synchronous Ethernet (ITU-T G.8261)
- Two external BITS inputs: DSI/E1 or 64 Kbps Composite Clock
- Internal Stratum 3 clock (holdover state)
- Primary and secondary sources (supports SSM bits)

CM-View Network Management System (NMS)

- TLI - based CLI
- SONET OAM&P
- SNMPv3, CORBA, TMF 814

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

