Cisco ONS 15454 CE-Series 10-Port Multirate Ethernet Card

The 10-port multirate Ethernet card for the Cisco® ONS 15454 Multiservice Provisioning Platform (MSPP) enables the delivery of true carrier-class Ethernet Private Line services.

Product Overview

Through its portfolio of Ethernet service cards, the Cisco ONS 15454 MSPP has enabled service providers and enterprises to effectively and efficiently expand their network capability from transporting only time-division multiplexing (TDM) services to delivering multiple services over a single, converged architecture and eliminating the need for multiple overlay infrastructures. With the introduction of the Cisco ONS 15454 CE-Series 10-Port Multirate Ethernet Card (CE-MR), the Cisco CE-Series card portfolio – which includes the 10/100 Mbps (CE-100) and the 1000 Mbps (CE-1000) cards on the Cisco ONS 15454 and 15310 platforms – gives service providers the ability to scale from 1.5-Mbps to 1-Gigabit Ethernet Private Line services. Additionally, the Cisco CE-MR card provides the service flexibility for customers to deploy multirate Ethernet services (10,100, 1000 Mbps) over a single card by supporting 10 Small Form-Factor Pluggable (SFP)-based multirate ports.

The Cisco CE-MR (Figure 1) meets important requirements for an end-to-end Ethernet Private Line application with features such as generic framing procedure (GFP), virtual concatenation (VCAT), software link capacity adjustment scheme (LCAS and SW-LCAS), link integrity, and comprehensive Ethernet and SONET statistics – including bandwidth utilization statistics and flow control. The Cisco CE-MR, with GFP and VCAT, helps service providers and enterprises maximize bandwidth utilization and promote industry-wide interoperability for Ethernet Private Line services. With LCAS, the Cisco CE-MR gives service providers the flexibility to dynamically add and remove bandwidth on Ethernet Private Line services. Ethernet and SONET statistics provide service-monitoring capabilities. For example, bandwidth utilization statistics reveal the usage patterns of end customers – data that can be critical for operations personnel or for network and business planners. Features such as link integrity provide faster convergence capability to end customers' Layer 2 networks connected through Ethernet private lines.

The Cisco ONS 15454 MSPP is the optical industry's first metro optical transport platform. It combines supercharged SONET/SDH transport, integrated optical networking (ITU grid wavelengths and DWDM, for example), and unprecedented multiservice interfaces on demand (such as TDM, Ethernet/IP, and storage) to deliver enormous economic benefits. The Cisco ONS 15454 provides the functions of multiple network elements in a single platform. As a critical component of a complete, end-to-end, advanced service architecture from Cisco, the Cisco ONS 15454 delivers a scalable optical transport mechanism and the intelligent Ethernet/IP support to cost-effectively deliver next-generation voice and data services.

Cisco continues its tradition of converged network services leadership with the introduction of the CE-MR card to the Cisco CE-Series, enabling the efficient delivery of Ethernet Private Line services without a major overhaul or redesign of existing transport infrastructure.

Figure 1. Cisco ONS 15454 CE-Series 10-Port Multirate Ethernet Card
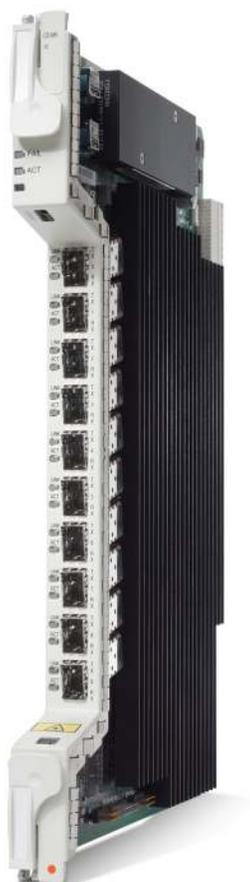
The Cisco CE-MR card includes the following features:

- Ten multirate SFP-based Ethernet ports

- Support for 10/1000/1000 Mbps SFP optics: 10/100/1000 Mbps BASE-T; 100 Mbps FX, LX, BX; 1000 Mbps SX, LX, ZX

- 10-Gbps SONET/SDH transport bandwidth per card

- Each multirate Ethernet port mapped to SONET/SDH (POS) using GFP-F (ITU-T G.7041) or LAN Extension (LEX) High-Level Data Link Control (HDLC) encapsulation

- Each POS can consist of high-order (HO) VCAT (SONET: STS-1-nv where n=1 to 21, STS-3C-nv where n=1 to 7; SDH: VC-4-nv where n=1 to 7), (LO) VCAT (SONET: Vt1.5-nv where n=1 to 64; SDH: VC-3-nv where n=1 to 21, VC12 where n=1 to 63) or contiguous concatenation (CCAT) (SONET: STS-1, -3c, -6c, -9c, -12c, -24c, -48c; SDH: VC-4, -4-2c, -4-3c, -4-4c, -4-8c, -4-16c) circuits

- Dynamic capacity increment/decrement (LCAS or SW-LCAS) to VCAT circuits

- Sub-50-millisecond (ms) SONET/SDH protection/restoration of CCAT transport circuits

- Transparent to Layer 2 bridging, switching, Ethernet MAC control protocols (Cisco EtherChannel® technology, 802.1x, Cisco Discovery Protocol, VLAN Trunking Protocol [VTP], Spanning Tree Protocol), and VLAN (802.1Q and QinQ)

- Ethernet link functions: autonegotiation, link speed auto sense, full/half duplex, flow control (802.3x)

- QoS capabilities: Packet prioritization based upon IP type of service (ToS) or 802.1P

- Jumbo packet support: 9600 bytes

- A-to-Z provisioning (Cisco Transport Controller and Cisco Transport Manager), Transaction Layer 1 (TL1) provisioning

- Simple Network Management Protocol (SNMP) alarms and Remote Monitoring (RMON) performance monitoring

- Cisco Transport Controller/Cisco Transport Manager/TL1 management

- Interoperation (over SONET/SDH) with Cisco G-Series and ML-Series cards

- Back-pressure flow control

- Terminal and facility loopback

- Link integrity support

Applications

The Cisco CE-MR provides the flexibility to meet the demands of a wide variety of Ethernet Private Line applications found within service provider and enterprise networks. Figures 2 and 3 outline a few of the applications that can be met using the Cisco CE-MR cards.

Reliable Enterprise Networking

When the Cisco ONS 15454 MSPP is equipped with the CE-MR card, enterprise users can build highly reliable multiservice networks to support data, voice, and video applications. Additionally, a network based on a Cisco ONS 15454 provides the flexibility to support traditional TDM-based services along with Ethernet services. The Cisco ONS 15454 provides transport scalability from 155 Mbps (OC-3/STM-1) up to 320 Gbps (32 10-Gbps wavelengths), positioning the enterprise network for future growth (Figure 2).

Figure 2.   Reliable Enterprise Networking
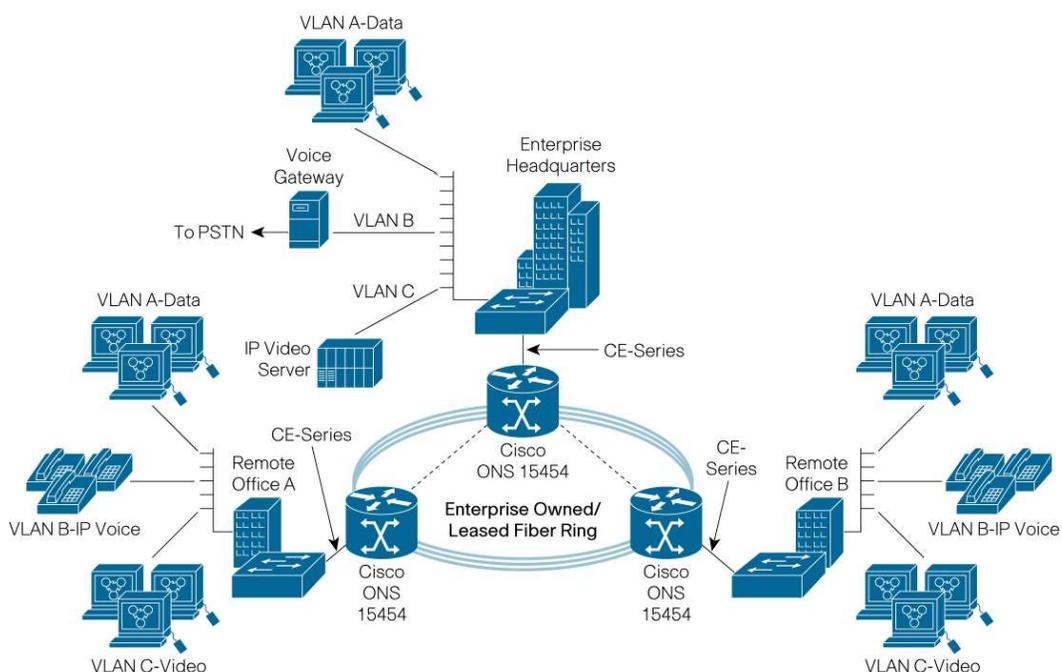
Private Line Carrier Ethernet

A metropolitan network that supports a wide range of service capabilities allows service providers to offer a tariff mix to meet each customer's needs. The Cisco ONS 15454 provides the foundation for building an advanced multiservice network over an extremely reliable SONET/SDH infrastructure (Figure 3). The Cisco ONS 15454 with CE-Series cards facilitates the delivery of data services such as transparent LAN services (TLS) or Internet access over a carrier-class optical infrastructure supporting traditional TDM services. The Cisco CE-MR card, with VCAT and LCAS functions, helps service providers offer a wide variety of Ethernet service-level agreements (SLAs). Virtual concatenation (VCAT) provides a more efficient use of the transport bandwidth for data user interfaces, and link capacity adjustment scheme (LCAS) provides an effective way for a service provider to change the allocated bandwidth to each customer. Additionally, provisioning an Ethernet circuit over a network equipped with a Cisco CE-MR card is easily accomplished through the use of the Cisco ONS 15454's embedded A-to-Z circuit provisioning wizard. The Cisco CE-MR card also supports TL1-based provisioning to simplify integration with many embedded service provider management systems.

Figure 3.   Reliable Enterprise Network Using SDH/SONET Infrastructure
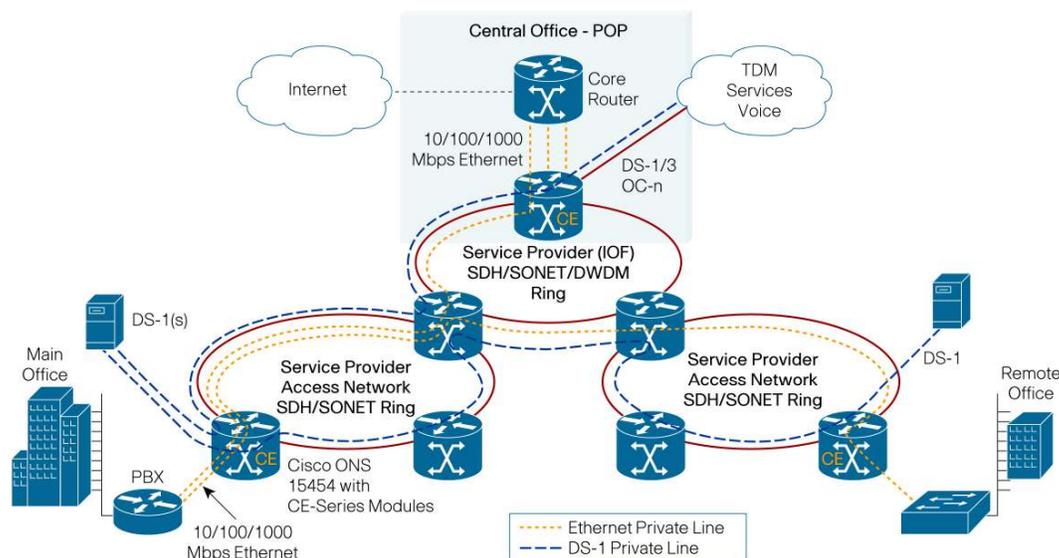
Product Specifications

Compact Design

- Single-width card slot design for increased shelf flexibility and scalability
- Up to 12 Cisco CE-Series cards per shelf assembly
- Up to 120 Ethernet ports (10/100/1000 Mbps) per shelf assembly

Data Architecture Options
- Point-to-point
- Hub-and-spoke using multiple circuits

Optical Transport Options

- Unidirectional-path switched ring (UPSR) and subnetwork connection protection (SNCP)
- 2-fiber and 4-fiber bidirectional line switched ring (BLSR) and multiplex section-shared protection ring (MS-SPR)
- Automatic protection switching (APS) and subnetwork connection (SNC) (1+1 uni- or bidirectional)
- Path-protected mesh networking (PPMN)
- Unprotected (0+1)

Table 1 outlines valid SONET and SDH circuit combinations for the Cisco CE-MR card according to service type. Table 2 lists various product specifications for the Cisco CE-MR card.

Table 1. SONET and SDH Circuit Combinations

	Service Type	SONET Circuit Type	SDH Circuit Type
1	Line-rate 1000 Mbps	STS-1-21v STS-3C-7v STS-24C STS-48c	VC4-7v VC4-8C VC-4-16c VC3-21v
2	Sub-rate 1000 Mbps	STS-1-nv , n = 1 to 20 STS-3C-nv, n = 1 to 6 STS-1, -3c, -6c, -9c, -12c	VC4-nv, n = 1 to 6 VC-4, -4-2c, -4-3c, -4-4c VC3-nv, n = 1 to 20
3	Line-rate 100 Mbps	STS-3c STS-1-3v STS-1-2v	VC4 VC3-2v VC3-3v VC12-50v
4	Sub-rate 100 Mbps	STS-1 STS-1-1v VT1.5-Xv (X = 1 to 64)	VC3 VC3-1v VC12 (n = 1 to 49)
5	Line-rate 10 Mbps	STS-1 VT1.5-Xv (X = 7)	VC12 (n = 5)
6	Sub-rate 10Mbps	VT1.5-Xv (X = 1 to 6)	VC12 (n = 1 to 4)

Table 2. Product Specifications

Attributes	Description
Ports	10 SFP ports
Port speed	10/100/1000 Mbps
SFP types	10/100/1000 Mbps BASE-T; 100 Mbps FX, LX, BX; 1000 Mbps SX, LX, ZX
Duplex	Full and autonegotiation
Flow control	Supported
Transport	Up to 10 "Virtual" POS (VCG) ports supporting HO-VCAT and LO-VCAT
Transport bandwidth per card*	10 Gbps in Cisco ONS 15454 slots 5,6,12,13 2.5 Gbps in Cisco ONS 15454 slots (1–4, 14–17)
Transport bandwidth allocation on "virtual" POS (VCG) ports	SONET: STS-1-nv (n = 1 to 21), STS-3C-nv (n = 1 to 7), vt1.5-nv (n = 1 to 64), STS-1, -3c, -6c, -9c, -12c, -24c, -48c; SDH: VC-4-nv (n = 1 to 7), VC3-nv (n = 1 to 21), vc12-nv (n = 1 to 63), VC-4, -4-2c, -4-3c, -4-4c, -4-8c, -4-16v
Transport bandwidth adjustment	LCAS and SW-LCAS (dynamic addition and removal of bandwidth)
Ethernet-over-SONET encapsulation	ITU-T G.7041 GFP-F, Cisco LEX, and Cisco HDLC options
QoS	802.1p and IP TOS-based prioritization
Frame size	64 to 9600 bytes

Attributes	Description
Link integrity	Yes
Service provisioning	A-to-Z service provisioning on Cisco Transport Controller, TL1-based service provisioning
Maximum power	100W
Operating temperature	23 to 131°F (–5 to 55°C)
Operating humidity	Noncondensing 5–95%
Dimensions (H x W x D)	12.65 x 0.72 x 9.99 in. (32.13 x 1.83 x 22.86 cm)

*Bandwidth usage restrictions when using LO-VCAT

Regulatory Compliance

EMC (Class A)

- NEBS Bellcore GR-1089-CORE, Issue 3 (Level 3, Type 2, and Type 4)
- IC ICES-003 Issue 3, 1997
- FCC 47CFR15
- ETSI 300-386-TC
- EN55022, EN55024
- CISPR 22, CISPR 24
- VCCI V-3/2000.04
- EN61000-6-1
- Resolution 237 (Brazil)

Product Safety

- NEBS Bellcore GR-1089-CORE, Issue 3 (Level 3, Type 2, and Type 4)
- IEC 60950-1/EN 60950-1, First Edition (CB report/certificate with all country deviations)
- UL and cUL/CSA 60950-1, First Edition

Laser Safety

- EN or IEC-60825-2
- IEC 60825-1 Amendment 2 (2001-01)
- CSA60950-1 or IEC 60950-1/EN60950-1
- 21CFR1040 (Accession Letter and CDRH Report)

Environmental

- NEBS Bellcore GR-63-CORE, Level 3
- ETS 300 019-2-1 (Storage, Class 1.1)
- ETS 300 019-2-2 (Transportation, Class 2.3)
- ETS 300 019-2-3 (Operational, Class 3.1E)

System Requirements

Table 3 outlines the Cisco ONS 15454 system requirements for operation of the Cisco CE-MR card.

Table 3.   System Requirements

System Parameter	SONET	SDH
Shelf assembly	SA-ANSI, SA-HD	SA-ETSI
Electrical Interface Assembly (EIA) panels or FMECs	Not required	Not required
Processor	TCC2 or TCC2P	TCC2 or TCC2P
Cross-connect	XC-10G XC-VXC-10G	XC-VXL-2.5 XC-VXL-10G XC-VXC-10G
System software	Release 8.5 or later (SONET)	Release 8.5 or later (SDH)
Slot compatibility	Slots 1 to 6, 12 to 17	Slots 1 to 6, 12 to 17

Ordering information

To place an order, visit the [Cisco Ordering Home Page](). Table 4 outlines the ordering information for the Cisco ONS 15454 CE-Series 10-Port Multirate Ethernet Card.

Table 4.   Ordering Information

Product Description	Part Number
Cisco CE-Series 10/100/1000-Mbps multirate Ethernet card, 10 ports, SONET system	15454-CE-MR-10=
Cisco CE-Series 10/100/1000-Mbps multirate Ethernet card, 10 ports, SDH system	15454E-CE-MR-10=
SFP – 10/100/1000 Ethernet BASE-T multirate copper RJ-45	ONS-SE-ZE-EL=
SFP – 10/100/1000 Ethernet BASE-T multirate copper RJ-45	ONS-SE-ZE-EL
SFP – 1000BASE-SX Gigabit Ethernet, 850 nm, MM, I-TEMP	ONS-SI-GE-SX=
SFP – 1000BASE-SX Gigabit Ethernet, 850 nm, MM, I-TEMP	ONS-SI-GE-SX
SFP – 1000BASE-LX Gigabit Ethernet, 1310 nm, SM, I-TEMP	ONS-SI-GE-LX=
SFP – 1000BASE-LX Gigabit Ethernet, 1310 nm, SM, I-TEMP	ONS-SI-GE-LX
SFP – 1000BASE-ZX Gigabit Ethernet, 1550 nm, SM, I-TEMP	ONS-SI-GE-ZX=
SFP – 1000BASE-ZX Gigabit Ethernet, 1550 nm, SM, I-TEMP	ONS-SI-GE-ZX
SFP – 100 Mbps Short Reach – 1310 nm, MM, LC, I-TEMP	ONS-SI-100-FX=
SFP – 100 Mbps Short Reach – 1310 nm, MM, LC, I-TEMP	ONS-SI-100-FX
SFP – 100 Mbps Long Reach – 1310 nm, SM, LC, I-TEMP	ONS-SI-100-LX10=
SFP – 100 Mbps Long Reach – 1310 nm, SM, LC, I-TEMP	ONS-SI-100-LX10
SFP – 10/100 BX-U, EXT	ONS-SE-100-BX10U=
SFP – 10/100 BX-U, EXT	ONS-SE-100-BX10U
SFP – 10/100 BX-D, EXT	ONS-SE-100-BX10D=
SFP – 10/100 BX-D, EXT	ONS-SE-100-BX10D

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, see [Cisco Technical Support Services]() or [Cisco Advanced Services]().

For More Information

For more information about the Cisco ONS 15454 MSPP, visit [http://cisco.com/en/US/products/hw/optical/ps2006/ps2010/index.html]() or contact your local account representative.

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