Cisco ONS 15454 CE 8-Port 10/100Base-T Ethernet Card

The Cisco® Carrier Ethernet (CE) Card (Figure 1) for the Cisco ONS 15454 Multiservice Provisioning Platform (MSPP) helps enable the delivery of true carrier-class, private-line Ethernet services. Through its portfolio of Ethernet service cards, the Cisco ONS 15454 has helped enable service providers and enterprises to effectively and efficiently migrate their networks from offering/transporting only time-division-multiplexing (TDM) services to networks capable of multiservice delivery over a single, converged architecture and eliminating the need for multiple overlay infrastructures. The introduction of the CE-Series module, with generic framing procedure (GFP), virtual concatenation (VCAT), and link capacity adjustment scheme (LCAS) helps service providers and enterprises maximize bandwidth utilization and promote industrywide interoperability for Ethernet private line services.

Figure 1. Cisco ONS 15454 CE 8-Port 10/100Base-T Ethernet Card

The Cisco ONS 15454 MSPP is the optical industry's first metro optical transport platform. The Cisco ONS 15454 combines supercharged SONET/SDH transport, integrated optical networking (ITU grid wavelengths and dense wavelength-division multiplexing [DWDM], for example), and unprecedented multiservice interfaces on demand (TDM, Ethernet/IP, and storage, for example) to deliver radical 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 Systems®, the Cisco ONS 15454 delivers a scalable optical transport mechanism and intelligent Ethernet/IP support required 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-Series and the Cisco ONS 15454 MSPP CE 8-port 10/100Base-T Ethernet Card, which helps enable the efficient delivery of private-line Ethernet services without a major overhaul or redesign of existing transport infrastructure.

Ethernet Card Overview

The Cisco CE 8-port Ethernet Card is a single-slot line card offering 8-port, 10/100-Mbps Ethernet via standard RJ-45 interfaces. Traffic from the eight interfaces is encapsulated into a SONET/SDH payload using either GFP or framing based on high-level data link control (HDLC). The resulting packet-over-SONET/SDH (POS) traffic is then mapped into a SONET circuit for transport across the network. These circuits form a one-to-one relationship with the eight front-panel ports and are referred to as virtual concatenated groups (VCGs). Each VCG uses low-order or high-order contiguous and/or virtual concatenation mechanisms to determine circuit sizing. The card also supports LCAS, which allows hitless dynamic adjustment of SONET/SDH link bandwidth. Additionally, each card supports packet processing, classification, queuing based on quality of service (QoS), and traffic-scheduling features, all required for supporting advanced services delivery.

The Cisco ONS 15454 MSPP CE 10/100Base-T Ethernet Card includes these features:

- 8-port 10/100Base-T, RJ-45 connectors
- 4 x 150 Mbps (4 x STS-3/VC4) SONET/SDH transport bandwidth per card
- Each 10/100Base-T port mapped to SONET/SDH POS using GFP-F (ITU-T G.7041) or LAN Extension (LEX) (HDLC) encapsulation
- Each POS can consist of high-order contiguous concatenation (CCAT) (SONET – STS-1, STS-3c; SDH – VC4) or VCAT (STS-1-1v, STS-1-2v, STS-1-3v) circuits
- Each POS port can consist of low-order contiguous concatenation (CCAT) (SDH – VC3) or VCAT (SONET – VT1.5-Xv where X=1–64; SDH – VC12-Xv where X=1–63, VC3-1v, VC3-2v, VC3-3v) circuits
- In-service capacity increment/decrement (ITU-T G.7042 LCAS)
- Sub-50-millisecond (ms) SONET/SDH protection/restoration of 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
- Maximum packet size supported: 1548 bytes
- A-to-z provisioning (Cisco Transport Controller and Cisco Transport Manager), TL-1 provisioning
- Simple Network Management Protocol (SNMP) alarms and Remote Monitoring (RMON) performance monitoring
- Cisco Transport Controller/Cisco Transport Manager/TL-1 management
- Interoperation with (over SONET/SDH) G-Series and ML-Series cards
- Back-pressure flow control
- Terminal and facility loopback
- Link integrity support

Product Applications

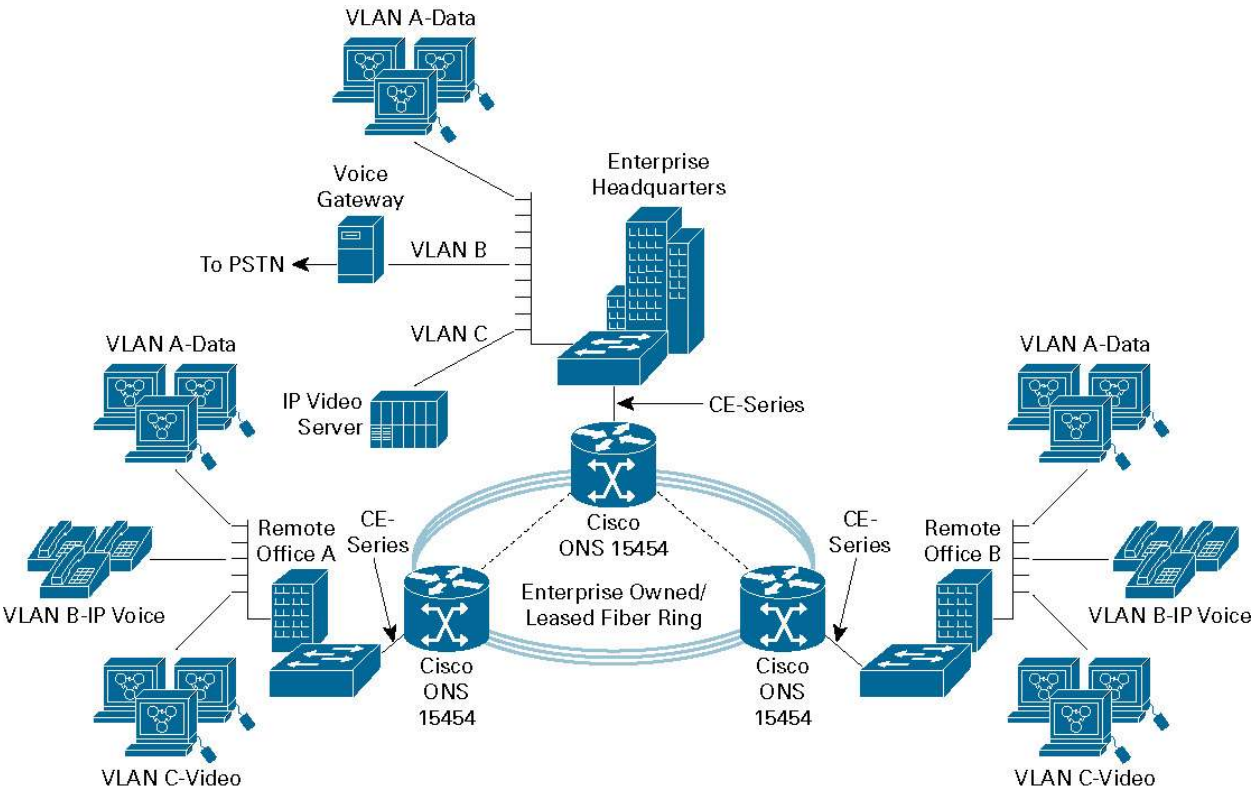
Cisco ONS 15454 CE 8-port Ethernet Card provides the flexibility to meet the demands of a wide variety of private line Ethernet applications found within service provider and enterprise networks. Figures 2 and 3 outline a few of the applications that can be met using the CE-Series cards.

Cisco ONS 15454 CE 8-port Ethernet Card and the Cisco ONS 15310-CL CE Card are fully interoperable, allowing service providers to efficiently extend the Carrier Ethernet services across the metro and farther out into the access networks.

Reliable Enterprise Networking

When the Cisco ONS 15454 is equipped with the CE-Series 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 (thirty-two 10-Gbps wavelengths), positioning the enterprise network for future growth.

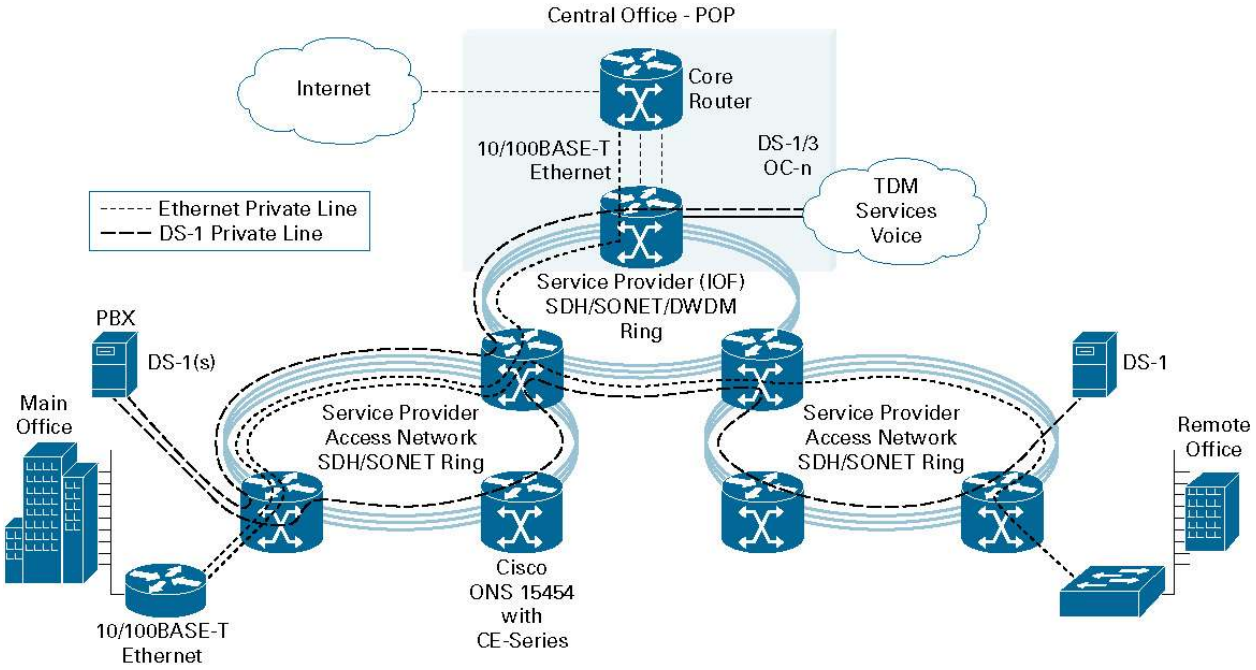
Figure 2. Reliable Enterprise Networking



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 CE 8-port Ethernet Card helps enable 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 CE-Series Ethernet Card, with VCAT and LCAS functions, helps service providers offer a wide variety of Ethernet service-level agreements (SLAs). VCAT provides a more efficient use of the transport bandwidth for data user interfaces, and LCAS provides an effective way for a service provider to change the allocated bandwidth to each customer. Additionally, provisioning of an Ethernet circuit over a network equipped with a CE 8-port Ethernet Card is easily accomplished through the use of the Cisco ONS 15454's embedded a-to-z circuit provisioning wizard for network-level circuit creation. The CE 8-port Ethernet Card also supports TL-1-based provisioning to simplify integration with many embedded service provider management systems.

Figure 3. Reliable Enterprise Network Using SDH/SONET Infrastructure



Specifications

Table 1 outlines valid SONET circuit combinations for the Cisco ONS 15454 CE 100Base-T Ethernet Card according to service type, and Tables 2 and 3 indicate the total number of services available per card. Table 4 lists various product specifications for the CE-Series Ethernet Card.

Table 1. Valid SONET Circuit Combinations

	Service Type	SONET Circuit Type	SDH Circuit Type
1	Line Rate 100Base-T	STS-3c STS-1-3v STS-1-2v	VC4 VC3-2v VC3-3v VC12-50v
2	Sub Rate 100Base-T	STS-1 STS-1-1v VT1.5-Xv (X=1–64)	VC3 VC3-1v VC12(n = 1–49)
3	Line Rate 10Base-T	STS-1 VT1.5-Xv (X=7)	VC12 (n = 5)
4	Sub Rate 10Base-T	VT1.5-Xv (X=1–5)	VC12 (n = 1–4)

Table 2. Maximum Number of Services per Card in a SONET Chassis

Service Mix Options per Card	100Base-T – Line Rate		100Base-T – Sub Rate	10Base-T – Line Rate or Sub Rate	Total Active Services per Card
	STS-3c, ST-1-3V	STS-1-2v	STS-1	VT1.5-Xv (X=1-7)	
1	4	0	0	0	4
2	3	1	1	0	5
3	3	0	3	0	6
4	3	0	0	4 (X=1–21)*	7*
5	2	2	2	0	6
6	2	1	4	0	7
7	2	1	1	4 (X=1–21)	8*
8	2	0	6	0	8
9	2	0	3	3 (X=1–28)	8
10	2	0	0	6 (X=1–28)	8
11	1	3	3	0	7
12	1	2	5	0	8
13	1	2	2	3 (X=1–28)	8
14	1	1	1	5 (X=1–28)	8
15	1	0	7	0	8
16	1	0	3	4 (X=1–42)	8
17	1	0	0	7 (X=1–28)	8
18	0	4	4	0	8
19	0	3	3	2 (X=1–42)	8
20	0	0	8	0	8
21	0	0	4	4 (X=1–42)	8
22	0	0	0	8 (X=1–42)	8

*This LO-VCAT circuit combination is achievable if one of the first two circuits created on the card is a LO-VCAT circuit. If the first two circuits created on the card are HO-VCAT or CCAT STS circuits, then a maximum of six LO-VCAT circuits can be added on the card.

Table 3. Maximum Number of Services per Card in a SDH Chassis

Service Mix Options per Card	100Base-T – Line Rate		100Base-T – Sub Rate	10Base-T – Line Rate or Sub Rate	Total Active Services per Card
	VC4, VC-3-3V	VC-3-2v	VC-3	VC-12-Xv	
1	4	0	0	0	4
2	3	1	1	0	5
3	3	0	3	0	6
4	3	0	0	3 (X=1–21)	6
5	2	2	2	0	6
6	2	1	4	0	7
7	2	1	1	3 (X=1–21)*	7
8	2	0	6	0	8
9	2	0	3	3 (X=1–21)	8
10	2	0	0	6 (X=1–21)	8
11	1	3	3	0	7
12	1	2	5	0	8
13	1	2	2	3 (X=1–21)*	8
14	1	1	1	5 (X=1–21)*	8
15	1	0	7	0	8
16	1	0	3	2 (X=1–32) plus 2 (X=1–31)	8
17	1	0	0	7 (X=1–21)	8
18	0	4	4	0	8
19	0	3	3	1 (X=1–32) plus 1 (X=1–31)	8
20	0	0	8	0	8
21	0	0	4	2 (X=1–32) plus 2 (X=1–31)	8
22	0	0	0	4 (X=1–32) plus 4 (X=1–31)	8

*This LO-VCAT circuit combination is achievable if the VC-12 circuits are created before the VC-3 circuits.

Table 4. Product Specifications

Attributes	Description
Ports	Eight 10/100Base-T Ethernet ports
Port speed	10/100 Mbps
Duplex	Full, half, and autonegotiation
Flow control	Supported
Transport	Up to 8 “Virtual” POS (VCG) ports supporting LO/HO-VCAT
Transport bandwidth per card	Up to 4 x 150 Mbps
Transport bandwidth allocation on “virtual” POS (VCG) ports	SONET – VT1.5-xv (X=1–64), STS-1, STS-1-1v, STS-1-2v, STS-1-3v, and STS-3c SDH – VC12-xv (X=1–63), VC3, VC3-1v, VC3-2v, VC3-3v and VC4
Transport bandwidth adjustment	Optional using the ITU-T G.7042 LCAS mechanism
Ethernet over SONET encapsulation	ITU-T G.7041 GFP-F, Cisco LEX, and Cisco HDLC options
QoS	802.1p and IP TOS based prioritization
Service provisioning	Carrier Ethernet 100Base-T Card: a-to-z service provisioning on Cisco Transport Controller, TL-1-based service provisioning

Attributes	Description
Maximum power	50W
Operating temperature	32 to 122°F (0 to 50°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)

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

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

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

The Cisco ONS 15454 system requirements for operation of the CE 8-Port 10/100Base-T Ethernet Card are outlined in Table 5.

Table 5. System Requirements

System Parameter	SONET	SDH
Shelf assembly	SA-ANSI, SA-HD, NEBS3E	SA-ETSI
Electrical Interface Assembly (EIA) panels or FMECs	Not required	Not required
Processor	TCC2 or TCC2P	TCC2 or TCC2P
Cross-connect	XC-VT XC-10G XC-VXC-10G	XC-VXL-2.5 XC-VXL-10G XC-VXC-10G
System software	Release 5.0 or later (SONET)	Release 6.0 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 6 outlines the ordering code for the Cisco ONS 15454 CE 8-Port 10/100Base-T Ethernet Card.

Table 6. Ordering Information

Product Description	Part Number
10/100 Mpbs Ethernet card, CE-Series, 8 ckt, SONET system	15454-CE-100T-8=
10/100 Mpbs Ethernet card, CE-Series, 8 ckt, SDH system	15454E-CE-100T-8=

Service and Support

Cisco Systems 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, visit http://www.cisco.com/en/US/products/hw/optical/ps2006/ps2010/index.html or contact your local account representative.

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at **www.cisco.com/go/offices.**

Printed in USA C78-651534-00 02/11