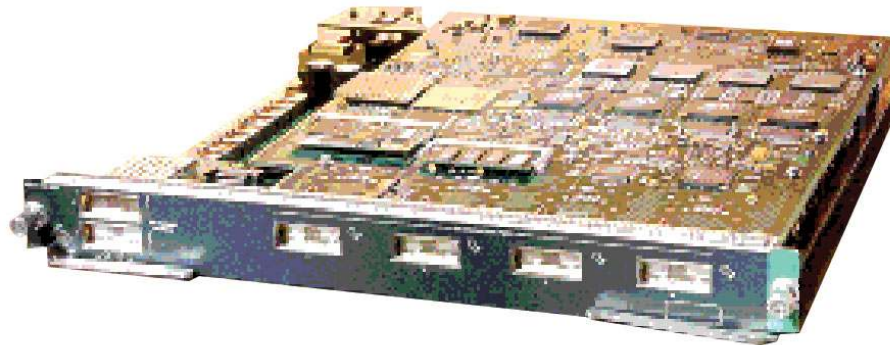


ENHANCED GIGABIT ETHERNET OPTICAL SERVICES MODULE FOR THE CISCO 7600 SERIES INTERNET ROUTER

High-Performance IP Services Delivery over Gigabit Ethernet for Service Provider Applications

Figure 1

Enhanced Gigabit Ethernet Optical Services Module



The growth of the packet networking and value-added applications has led to the need for the next-generation of capacity and service scaling in service provider networks. Gigabit Ethernet has emerged as a crucial technology at the network edge and access for enabling high-speed, cost-effective network connectivity to power Layer 2 or Layer 3 service offerings. In addition to the scalable bandwidth provided by Gigabit Ethernet, the service provider's next-generation network also needs to deliver sophisticated packet services that enable and enforce tiered levels of provisioned bandwidth to meet the needs of a diverse customer base. The ability to deliver either Layer 2 or Layer 3 end-user services provisioned with features such as quality of service (QoS), traffic shaping, and traffic accounting have become critical requirements that must be integrated with high-speed Gigabit Ethernet connectivity to deliver the network capabilities necessary to ensure service provider success.

To meet these requirements, Cisco System offers the Enhanced Gigabit Ethernet Optical Services Module (OSM) for the Cisco 7600 Series Internet Router (Figure 1). This module allows service providers to offer a wide range of end-user services based on IP, Multiprotocol Label Switching (MPLS), and Ethernet over MPLS (EoMPLS) technologies over high-performance Gigabit Ethernet interfaces.

Service providers can deploy the Cisco Enhanced Gigabit Ethernet OSM in a variety of network architectures and configurations. Furthermore, the Enhanced Gigabit Ethernet OSM supports the delivery of versatile end-user services with the ability to scale this service delivery to thousands of individual customers. As a result, the Enhanced Gigabit Ethernet OSM is uniquely capable of delivering a broad range of end-user services provisioned with QoS, security, and traffic-shaping features offered on a per-customer basis.

Table 1 below provides a hardware feature summary describing both features and benefits of the Enhanced Gigabit Ethernet Optical Services Module:

Table 1. Hardware Feature Summary

Feature	Benefit
Support for 4 WAN Gigabit Ethernet interfaces per module, each of which delivers high-performance packet services, with up to 8000 traffic queues per module	Delivers sophisticated packet service capabilities on a per-user basis over high-performance Gigabit Ethernet interfaces
Support for an additional 2 LAN Gigabit Ethernet interfaces per module	Provides simultaneous WAN and LAN access to satisfy diverse applications
Throughput of up to 6 Mpps per Parallel Express Forwarding (PXF) IP services processor, with 2 PXFs per module, for a total of 12 million packets per second (Mpps) per module	Delivers high throughput while simultaneously supporting sophisticated packet services, such as QoS and traffic shaping
Upgradable programmed feature set using a Cisco PXF Network Processor	Provides greater flexibility than traditional ASIC-based interface cards, while delivering performance similar to application-specific integrated circuit (ASIC)-based designs
Compatibility with either the Cisco 7600 Series Internet Router or the Cisco Catalyst® 6500 Series Switch chassis (system requirements defined below)	Provides investment protection for customers, whether they have an installed base of Cisco 7600 Series or Catalyst 6500 Series chassis

ENHANCED OPTICAL SERVICE MODULES

The Enhanced Gigabit Ethernet OSM interface card is a member of the new family of Enhanced OSMs for the Cisco 7600 Series. This family of interface cards supports all features of the original Cisco 7600 Series OSM interface cards, but takes the Cisco 7600 Series platform to a higher level of performance and functionality. Some of the primary feature differences between the original and the Enhanced OSMs include those listed in Table 2.

Table 2. Comparison of the Original and the Enhanced Cisco 7600 Series OSMs

Enhancement	Benefit
Increase in direct memory access (DMA) memory from 64 MB to 256 MB per PXF network processor	Support for larger traffic-shaping queues. The Enhanced OSMs support a minimum of 8000 QoS queues per OSM module.
Increase from 256 to a maximum of 1023 VRFs (VPN [virtual private network] routing/forwarding) per chassis for MPLS Layer 3 configurations	Increased service density per chassis for support of MPLS VPN services for end users.
Support for enhanced QoS features, such as Weighted Random Early Detection (WRED), Class-Based Weighted Fair Queuing (CBWFQ), Low Latency Queuing (LLQ), and traffic shaping	Improved delivery of service-level agreements to end customers.
Future support for Layer 2 network services, such as (VPLS) Virtual Private LAN Service based on MPLS technologies	Ability to deliver Layer 2 services, such as Frame Relay, Ethernet, and ATM, and Layer 3 services, such as Internet access and 2547 VPNs, in a consolidated network architecture.

QOS FEATURES

The Enhanced Gigabit Ethernet OSM is unique in its ability to deliver Gigabit Ethernet performance combined with per-end-customer traffic shaping and QoS, with as many as 8000 separately provisioned traffic queues. These QoS features can be combined with the various end-user services the Cisco 7600 Series supports, including IP routing, MPLS IP VPN, and Ethernet over MPLS (IETF Martini Draft). By combining these QoS features with the end-user services supported by the Cisco 7600 Series, the Enhanced Gigabit Ethernet OSM provides the service provider with unparalleled flexibility to deliver an equally unparalleled range of end-user service definitions. Table 3 provides the range of combinations of end-user service definitions, including QoS features, that the Enhanced Gigabit Ethernet OSM can support.

Table 3. End-User Service Definitions the Enhanced Gigabit Ethernet OSM Can Support

	Traffic Shaping	Low Latency Queuing	Class-Based Weighted Fair Queuing	Weighted Random Early Detection
	TS	LLQ	CBWFQ	WRED
IP Precedence	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS
DSCP	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS
BGP Index	IPv4	IPv4	IPv4	IPv4
MPLS Exp	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS	IPv4, MPLS
VLAN	EoMPLS	NA	NA	NA
Hierarchy of VLAN with IPP or DSCP	IPv4	IPv4	IPv4	IPv4

Even when configured with a wide variety of end-user service definitions, the Enhanced Gigabit Ethernet OSM maintains extremely high performance on each of its four WAN Gigabit Ethernet ports.

ABOUT THE CISCO 7600 PLATFORM

The Cisco 7600 Series is the industry's only edge router that delivers robust, high performance features for a range of service provider edge and enterprise MAN/WAN applications. Coupled with the broadest set of interfaces and innovative adaptive network processing technology, the Cisco 7600 leads the industry with integrated Ethernet and private line aggregation capabilities. This unique combination enables carriers and enterprises alike to improve operational efficiency at the network edge while maximizing return on investment.

ORDERING INFORMATION

Part Number	Description
OSM-2+4GE-WAN+	2+4-port Enhanced Gigabit Ethernet Optical Services Module
OSM-2+4GE-5PACK+	5 pack of 2+4-port Enhanced Gigabit Ethernet Optical Services Module
MEM-OSM-128M	128-MB ECC Memory for Optical Services Modules
MEM-OSM-256M	256-MB ECC Memory for Optical Services Modules
MEM-OSM-512M	512-MB ECC Memory for Optical Services Modules

TECHNICAL SPECIFICATIONS

Gigabit Ethernet Specifications

- 802.3z and 802.3x compliant
- GBIC-based Gigabit Ethernet interfaces with SC connectors:
 - 1000BASE-SX
 - 1000BASE-LX/LH
 - 1000BASE-ZX
- Support for 802.1Q VLAN trunking
- Support for Hot Standby Routing Protocol (HSRP)
- Support for autonegotiation flow control
- Support for 220 ms of packet buffering per port
- Support for jumbo frames with an MTU of 9192 bytes
- Support for up to 32,000 MAC addresses per port
- Support for up to 32,000 simultaneous access control list (ACL) entries
- Support for Simple Network Management Protocol (SNMP) I and II and four remote monitoring (RMON) groups per port: statistics, history, alarms, and events
- Support for online insertion and removal (OIR)

Cisco 7600 Series Performance Features

- Hardware-based Cisco Express Forwarding scaling from 30 Mpps to more than 100 Mpps
- ACL application, with as many as 15,000 ACL rules, at 30 Mpps
- QoS classification at 30 Mpps
- Policy routing at 30 Mpps
- Support for 128,000 traffic accounting entries per system
- Support for OIR
- Support for SNMP I and II and four RMON groups per port: statistics, history, alarms, and events

Physical Specifications

- Occupies one slot in the Cisco 7600 Series platform
- Occupies one slot in the Cisco Catalyst 6500 Series platform
- Four IP service-enabled Gigabit Ethernet optical ports per optical service module
- Up to eight Enhanced Gigabit Ethernet OSMs supported in a nine-slot Cisco 7600 Series chassis
- Required with either Cisco 7600 Series or Catalyst 6500 Series chassis:
 - Supervisor Engine 2: WS-X6K-S2-MFSC2
- Recommended with either Cisco 7600 Series or Cisco Catalyst 6500 Series chassis:
 - Switch Fabric Module—256 Gbps Crossbar Fabric: WS-C6500-SFM
- Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3.0 x 35.6 x 40.6 cm)
- Weight: 10.4 lb or 4.7 kg
- Mean time between failure (MTBF): seven years for system configuration
- Power consumption: 359 watts at 4.35 amps

Indicators and Interfaces

- Status: green (operational), red (faulty), orange (module booting or running diagnostics)
- Link good: green (port active), orange (disabled), off (not active or not connected), blinking orange (failed diagnostic and disabled)

Processors and Memory

One 300-MHz R7000 MIPS RISC processor

- Configurable packet/Route table memory options:
 - 128 MB ECC SDRAM (default)
 - 128 MB ECC SDRAM
 - 256 MB ECC SDRAM
 - 512 MB ECC SDRAM (future option)

Two PXF IP service processors

- Provides up to 12 Mpps of distributed IP service application per line card
- Nonconfigurable PXF memory per line card:
 - 256-MB SDRAM of packet buffer memory (CRC checks per packet)
 - 264-MB SSRAM of packet processing memory

Management Information Base (MIB) Support

- ETHERLIKE-MIB (RFC 1643)
- IF-MIB (RFC 1573)
- Bridge MIB (RFC 1493)
- CISCO-STACK-MIB
- CISCO-VTP-MIB
- CISCO-CDP-MIB
- RMON MIB (RFC 1757)
- CISCO-PAGP-MIB
- CISCO-VLAN-BRIDGE-MIB
- CISCO-VLAN-MEMBERSHIP-MIB
- ENTITY-MIB (RFC 2037)
- HC-RMON
- RFC1213-MIB (MIB-II)
- SMON-MIB

Maximum Station-to-Station Cabling Distance

- 1000BASE-SX: 62.5 um multimode fiber: up to 275 m
- 1000BASE-SX: 50 um multimode fiber: up to 550 m
- 1000BASE-LX: 62.5 um multimode fiber: up to 550 m
- 1000BASE-LX: 50 um multimode fiber: up to 550 m
- 1000BASE-LX: 9/10 um single-mode fiber: up to 5 km
- 1000BASE-LH: 62.5 um multimode fiber: up to 550 m
- 1000BASE-LH: 50 um multimode fiber: up to 550 m
- 1000BASE-LH: 9/10 um single-mode fiber: up to 10 km
- 1000BASE-ZX: 9/10 um single-mode fiber: up to 70 km

- 1000BASE-ZX: dispersion-shifted fiber: up to 100 km

Environmental Conditions

- Operating temperature: 32 to 104°F (0 to 40°C)
- Storage temperature: -40 to 167°F (-40 to 75°C)
- Relative humidity: 10 to 90 percent, noncondensing
- Operating altitude: -60 to 2000 m

REGULATORY COMPLIANCE

Safety Compliance

- UL1950 with UL 60950
- CSA C22.2 No. 60950
- EN60950
- IEC 60950
- TS 001
- CE marking
- AS/NZS 3260

EMC Compliance

- FCC Part 15 (CFR 47) Class A
- VCCI Class A
- EN55022 Class A
- CISPR 22 Class A
- CE marking
- AS/NZS 3548 Class A
- EN55024
- EN 300 386-2
- ICES 003 Class A
- EN50082-1
- EN61000-6-1

NEBS Level 3 Compliance

The Cisco 7600 Series Internet routers are NEBS Level 3 compliant according to the following specifications:

- GR-63-CORE - NEBS: Physical Protection
- GR-1089-CORE - NEBS: EMC and Safety

ETSI Compliance

- ETS-300019 1-1 Class 1.1
- ETS-300019 1-2 Class 2.3
- ETS-300019 1-3 Class 3.1



Minimum Software Revision

- Cisco IOS® Software Version 12.1(13)E3

SERVICE AND SUPPORT

Cisco Systems, Inc. offers a wide range of service support offerings for both service provider and enterprise customers. Cisco has earned the highest customer satisfaction ratings in the industry by providing the world-class service and support necessary to deploy, operate, and optimize networks. Whether the goal is speed to market, maximizing network availability, or enhancing customer satisfaction and retention, Cisco is committed to the success of its customers.

FOR MORE INFORMATION

For more information on Cisco service and support programs and benefits, go to <http://www.cisco.com/en/US/support/index.html>.

For more information about the Cisco 7600 Series Routers, visit: Cisco at <http://www.cisco.com/go/7600> or contact your account representative today.

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