

## Cisco ONS 15327 Two-Port Gigabit Ethernet Card

### Gigabit Ethernet Networking Flexibility in the Optical Metro Network

The Cisco ONS 15327 SONET Multiservice Provisioning Platform (MSPP) is a versatile, carrier-class optical metropolitan (metro) edge and access platform for service providers and enterprise customers (Figure 1). The Cisco ONS 15327 SONET MSPP delivers supercharged Synchronous Optical Network (SONET), integrated optical networking, unprecedented multiservices on demand, and radical economic value, all in a compact, three-rack unit (3RU) size.

Figure 1  
Cisco ONS 15327 and the New Two-Port Gigabit Ethernet Card G1000-2



The Cisco ONS 15327 SONET MSPP is a modular and scalable platform that can deliver services from DS1, DS3, or 10/100 Ethernet, to Gigabit Ethernet services over OC-3 to OC-48 networks. Based on the industry-leading Cisco ONS 15454 platform, the Cisco ONS 15327 provides an edge access complement to the Cisco ONS 15454 and can also provide a smaller, more economical alternative to the Cisco ONS 15454.

With the introduction of a new two-port Gigabit Ethernet card, model G1000-2, for the Cisco ONS 15327 Optical Transport Platform, service providers can now deliver gigabit media flexibility without building an overlay network or redesigning their existing SONET infrastructure. The unprecedented time-division multiplexing (TDM) capabilities of the Cisco ONS 15327, combined with evolutionary Gigabit Ethernet capabilities, enable service providers to deliver on the key market differentiators needed to ensure their success.

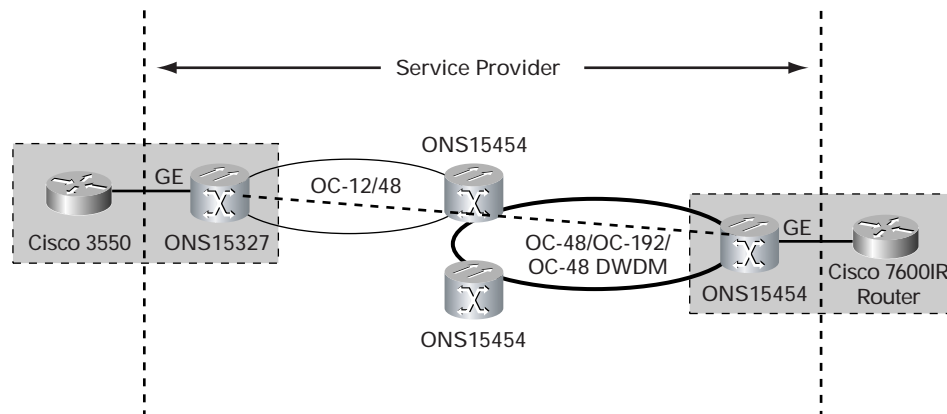
## Applications

The Cisco ONS 15327 can provide service providers with a versatile and powerful platform by allowing them the flexibility to offer their customers TDM-based services (DS1/DS3 and OC-n) along with 10/100 and Gigabit Ethernet.

The new Two-Port Gigabit Ethernet Card (G1000-2):

- Enables service providers to use Ethernet WAN transport (Ethernet private line) to offer customers carrier-class Ethernet services for both intra- and inter-metro Gigabit Ethernet
- Includes software to remotely scale Gigabit Ethernet services via A-to-Z provisioning and rapid service creation, to deliver bandwidth to the end customer in flexible STS increments
- Brings cost savings and flexibility to existing IP metro services delivery
  - When combined with the other features of a Cisco ONS 15327/15454 network, a service provider can offer IP on top of any media or protocol to its customers.
- Is ideal for colocation and carrier-hotel gigabit transport
- All these applications benefit from robust, carrier-class IP service delivery (50-ms protection), seamless software provisioning, and TDM service delivery, all in the same optical transport platform.

Figure 2  
Gigabit Ethernet Aggregation Diagram

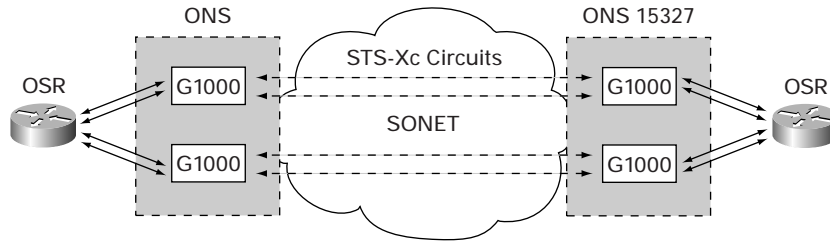


## Flexible Gigabit Networking

### Value Adds

- No overlay networks
- Carrier-class Ethernet
  - 50 ms via SONET protection
  - Client interface protection taking advantage of Cisco Gigabit EtherChannel<sup>®</sup> tunneling/link aggregation on connected devices (refer to Figure 3)
  - Hitless software upgrades
- Seamless, remote Gigabit Ethernet circuit bandwidth upgrades via integrated Cisco Transport Controller
- Efficient gigabit packing, up to 64-wire speed Gigabit Ethernet per metro ring (OC-48 optics)
- Multiple management options with Cisco Transport Controller, Cisco Transport Manager, Transaction Language One (TL-1), Common Object Request Broker Architecture (CORBA), and Simple Network Management Protocol (SNMP)

Figure 3  
Carrier-Class Ethernet

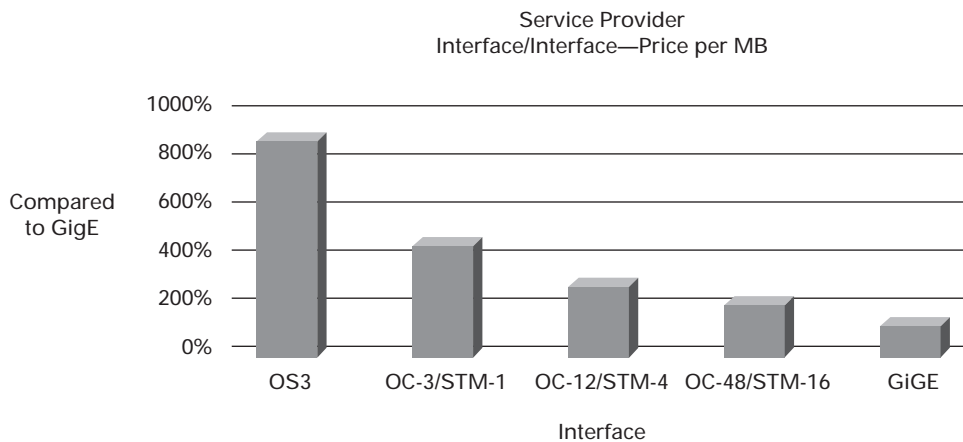


### Radical Economics

The radical economic benefit to using the Gigabit Ethernet solution on the Cisco ONS 15327 is driven by the same reasons for the explosion in Ethernet: its cost-effectiveness versus traditional packet-over-SONET (POS) interfaces. The cost-effectiveness of Ethernet is largely driven by the ease of understanding and simplicity in deployment, which in turn has driven user demand. Ethernet technology has seen an incredible adoption rate (estimated 1 billion Ethernet ports deployed) and an even larger decrease in the cost per port. The result is that the Cisco ONS 15327 can take advantage of the cost-effective Ethernet interface—Gigabit Ethernet in this case—to allow a service provider a more attractive high-bandwidth service offering the following benefits:

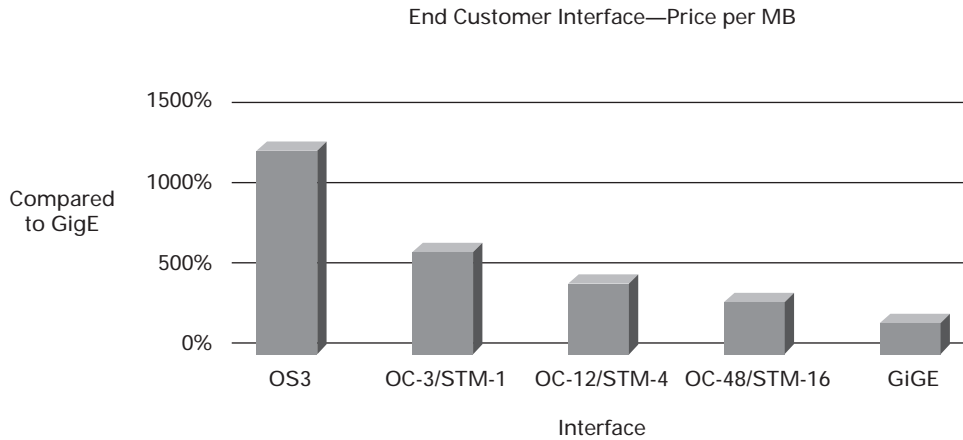
- *Lower interface-to-interface (I-to-I) costs*—The benefit of lower I-to-I costs as a result of taking advantage of Ethernet interfaces can be found in two areas:
  - *Service provider’s intra-office connections*—When a service provider interconnects equipment within its own facility (that is, a router to transport equipment), the cost of interconnection, measured in dollars per Mbps, can be lowered significantly by taking advantage of Ethernet interfaces. Figure 4 outlines the relative price per Mb (list) for interconnecting a router with POS interfaces to the Cisco ONS 15327 optical transport via various interface types (all Gigabit Ethernet-to-Gigabit Ethernet interconnections):

Figure 4  
I-to-I Cost per Mb



- *Service provider’s marketing advantages*—The service provider can take advantage of this lower I-to-I cost as a selling feature when marketing its Ethernet private-line service. By enabling its customers’ termination equipment to require a Gigabit Ethernet interface versus a POS interface, the service provider lowers its customers’ networking expenses to turn up a high-bandwidth service, as seen in Figure 5.

Figure 5  
End-Customer Interface-Price per Mb



An additional benefit derived from the cost-effective nature of the Gigabit Ethernet interface on the Cisco ONS 15327 is the service provider's ability to up-sell to higher-bandwidth, higher-margin services. The Cisco ONS 15327 supports flexible Gigabit Ethernet bandwidth provisioning, enabling the service provider to offer multiple service types, with different levels of transport bandwidth, from 50 Mbps to 1000 Mbps. As such, a service provider can market an entry-level "bronze" service package to a growing customer who provides a Gigabit Ethernet interface with 150-Mbps transport and 50-ms restoration. Depending upon the customer's termination equipment, cost of an OC-3 POS interface is very similar to that of a Gigabit Ethernet interface cost. Thus, initial customers need to purchase only the interfaces that they think are necessary.

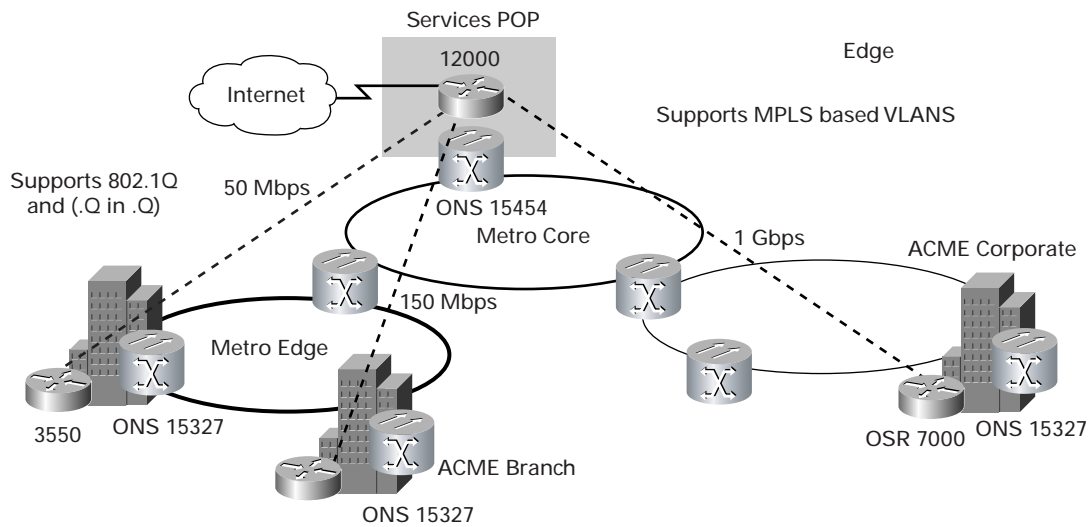
As a customer's needs grow, the service provider can up-sell a "silver" service package with 622 Mbps of transport bandwidth. This bandwidth increase on the Cisco ONS 15327 can be remotely software provisioned, eliminating a service provider truck roll and its associated cost. And, because the Gigabit Ethernet interface was prepositioned, the customer's network interface is ready for the additional bandwidth with no additional hardware interface costs.

Thus, the radical economic value from the Gigabit Ethernet interface offered on the Cisco ONS 15327 can be used in two ways to advantage by the service provider: lower intra-office networking cost and enable service provider marketing advantages through lower customer-related interface costs and increased customer satisfaction from responsiveness to bandwidth upgrades.

### Managing the Optical Transport Platforms

Provisioning and managing an optical transport device with the Cisco Transport Manager Java-based graphical user interface (GUI) is easier than ever. Cisco Transport Manager is the carrier-class element management system (EMS) for the Cisco ONS 15000 Series product line. Cisco Transport Manager provides advanced capabilities in the functional management areas of configuration, faults, performance, and security for Cisco optical network elements, subnetworks, and networks. Cisco Transport Manager is based on a client/server architecture that scales to support up to 1000 network elements and 100 simultaneous clients. Cisco Transport Manager is a key enabler for automation of the operations support system (OSS) through the northbound interfaces to a network management system (NMS) or OSS.

Figure 6  
VPN Scalability



### Cisco Transport Manager

- Scalable client/server EMS for Cisco optical transport products
- Integrated element manager for Cisco ONS family of optical platforms
- Java-based client, Solaris-based server, Oracle database
- Full fault, configuration, performance, and security management
- Tree-based network explorer, topology map, graphical crossconnect map
- CORBA, TL-1, SNMP northbound interfaces for OSS integration

### Cisco Transport Controller

- Integrated Java-based node and subnetwork control
- Consistent GUI for Cisco ONS 15454 and 15327
- Full node control: provisioning, alarm, maintenance, performance
- Subnet control: auto-discovery, topology map with drill-down, A-to-Z circuit provisioning, subnet alarm control

### TL-1

- Support for fault, inventory, provisioning, and performance

### SNMP

- Support for fault, inventory, and performance monitoring

Table 1

| Technical specifications parameter     | Cisco ONS 15327 G1000-2                                                                                                                                                                           |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ports                                  | Two small-form-factor pluggable (SFP) interface slots; SX, LX SFP support                                                                                                                         |
| Speed                                  | 1000 Mbps, bidirectional                                                                                                                                                                          |
| Transport bandwidth per card (maximum) | STS-48 (2.4 Gbps)                                                                                                                                                                                 |
| Circuit type                           | Point to point                                                                                                                                                                                    |
| Network topology                       | Unidirectional Path Switch Ring (UPSR), two-fiber Bidirectional Line Switch Ring (BLSR), linear 1 + 1 automatic protection switching (APS), path-protected mesh network (PPMN), unprotected spans |
| Protocol support                       | Layer 1 transport, no switching                                                                                                                                                                   |
| Flow control                           | 802.3x, per-port provisionable on/off, asymmetric                                                                                                                                                 |
| Gigabit EtherChannel tunneling         | Transparent                                                                                                                                                                                       |
| IEEE jumbo frames                      | Supported up to 10,000 bytes                                                                                                                                                                      |
| Power consumption (maximum)            | 45 watts                                                                                                                                                                                          |
| Card dimensions (H x W x D)            | 1.080 x 4.280 x 9.172 in.                                                                                                                                                                         |
| Operating temperature                  | 32 to 131°F, 0 to 55°C                                                                                                                                                                            |
| Operating humidity                     | 5 to 95% noncondensing                                                                                                                                                                            |
| Storage temperature                    | -40 to 185°F, -40 to 85°C                                                                                                                                                                         |
| Storage humidity                       | 5 to 95% noncondensing                                                                                                                                                                            |

Table 2

| Throughput performance<br>(as a percent of Gigabit<br>Ethernet interface speed) | Transport circuit size |        |        |        |         |         |         |
|---------------------------------------------------------------------------------|------------------------|--------|--------|--------|---------|---------|---------|
|                                                                                 | STS-1                  | STS-3c | STS-6c | STS-9c | STS-12c | STS-24c | STS-48c |
| Frame size bytes                                                                |                        |        |        |        |         |         |         |
| 64                                                                              | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 128                                                                             | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 256                                                                             | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 512                                                                             | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 1,024                                                                           | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 1,280                                                                           | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 1,518                                                                           | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |
| 10,000                                                                          | 5%                     | 15%    | 30%    | 45%    | 60%     | 100%    | 100%    |

Table 3

| System requirements component | Requirement               |
|-------------------------------|---------------------------|
| Processor/crossconnect        | Either XTC-14 or XTC-28-3 |
| System software               | R3.4.0 or higher          |

Table 4

| SONET product numbering information component | Description                                  |
|-----------------------------------------------|----------------------------------------------|
| 15327-G1000-2                                 | Gigabit Ethernet card, two SFP slots*        |
| 15327-SFP-LC-SX                               | 1000BASE-SX SFP module, 850 nm, multimode    |
| 15327-SFP-LC-LX                               | 1000BASE-LX SFP module, 1300 nm, single mode |

\*SFP modules not included



Corporate Headquarters  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

European Headquarters  
Cisco Systems Europe  
11, Rue Camille Desmoulins  
92782 Issy-les-Moulineaux  
Cedex 9  
France  
www-europe.cisco.com  
Tel: 33 1 58 04 60 00  
Fax: 33 1 58 04 61 00

Americas Headquarters  
Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
www.cisco.com  
Tel: 408 526-7660  
Fax: 408 527-0883

Asia Pacific Headquarters  
Cisco Systems, Inc.  
Capital Tower  
168 Robinson Road  
#22-01 to #29-01  
Singapore 068912  
www.cisco.com  
Tel: 65 317 7777  
Fax: 65 317 7799

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