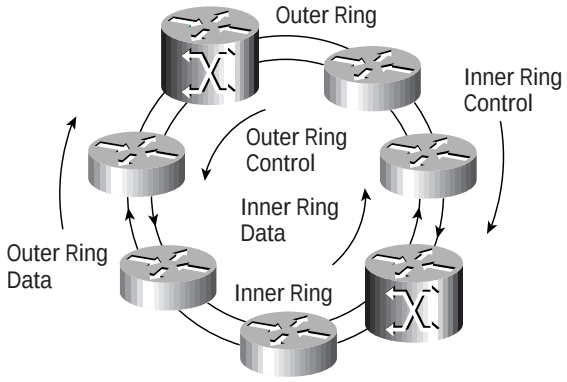
Data Sheet

GSR 12000 OC-48c/STM-16c DPT Line Cards

The Cisco Dynamic Packet Transport (DPT) products define a new generation of transport technology—packet-optimized optical transport solutions. These solutions combine the bandwidth-efficient and services-rich capabilities of IP routing with the bandwidth-rich, self-healing capabilities of fiber rings to deliver fundamental cost and functionality advantages over existing solutions.

Cisco Systems, Inc. has developed the OC-48c/STM-16c DPT line card. DPT rings are dual, counter-rotating fiber rings. Both fibers are concurrently utilized to transport both data and control traffic as depicted in Figure 1.

Figure 1
Dynamic Packet Transport



Spatial Reuse Protocol

Spatial Reuse Protocol (SRP) is the media-independent Media Access Control (MAC)-layer protocol that enables DPT functionality in ring configurations. The SRP MAC provides the base functionality for addressing, packet stripping, bandwidth control, and control message propagation on the packet ring.

Transport Flexibility and Evolution

DPT rings run on a variety of transport technology, including Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH), wave-division multiplexing (WDM), and dark fiber. DPT provides carriers with the flexibility to operate packet rings over their embedded fiber transport infrastructure as well as an evolution path to packet-optimized transport for high-bandwidth IP networks. An OC-48c/STM-16c DPT node consists of two line cards. The line cards are connected via the MATE interface. Using two inter-connected line cards, the dual working fiber rings will maximize the bandwidth of both rings. Each DPT line card also provides the choice of single mode short- or long-reach optics to meet application requirements.

Spatial Reuse

DPT ring packet-processing procedures utilize destination stripping—packets are removed from the ring by the intended destination node instead of utilizing bandwidth around the entire ring. Thus, the DPT ring provides packet-by-packet spatial reuse wherein multiple segments can concurrently exchange traffic at full ring bandwidth without interference.

Ring Bandwidth Multiplication

DPT uses optimal path selection, spatial reuse, statistical multiplexing, and two working fibers to maximize the traffic—carrying capacity of the ring—and to minimize initial and growth costs. DPT rings also utilize the SRP Fairness Algorithm (SRP-fa) to ensure that both global fairness and local bandwidth optimization are delivered on all segments of the ring.

Transparent IP Service Extension

DPT provides an extensive set of packet-handling features to efficiently extend enhanced IP services over the metro area, including:

- Packet prioritization
- Multiple levels of queuing and scheduling
- Multicasting
- MAC-based address filtering to extend enhanced IP services over the metro area

Proactive Monitoring and Robust Self-Healing

DPT combines powerful SONET/SDH overhead processing with Layer 2 management capabilities to deliver proactive, multilayer performance-monitoring, fault-detection, and fault-isolation capabilities. DPT provides sophisticated protection-switching capabilities for responsive self-healing via the Intelligent Protection Switching (IPS) algorithm. IPS enables sub-50-ms protection-switching performance for rapid IP service restoration and protection hierarchy to handle cases of multiple, concurrent degrade, failure, or maintenance events.

"Plug-and-Play" Operation

DPT rings utilize automatic procedures for address assignment and resolution, ring topology and status discovery, and control message propagation to optimize ring traffic routing and management procedures. Service providers can rapidly put DPT rings into operation and add and remove nodes from the ring while minimizing expensive and time-consuming configuration and provisioning requirements.

Figure 2
Cisco DPT Line Cards

DPT Ring Applications

DPT rings enable a key set of applications for service providers and large enterprises, including:

- Robust, high-bandwidth intra-point-of-presence (POP) connectivity
- Regional POP interconnectivity
- Cable data access and distribution
- Metropolitan-area packet transport for business and residential access services
- Regional backbone rings
- Distributed enterprise campus rings

Table 1 Line Card Features and Benefits

Feature	Benefit
SRP Fairness and Spatial Reuse	Maximizes ring capacity, cost-effectiveness, and service stability via spatial reuse, statistical multiplexing, and distributed, inter-nodal fairness
Intelligent Protection Switching	Maximizes ring robustness via self-healing around ring node or fiber failures and intelligent handling of multiple concurrent trouble events; provides fast IP service restoration without Layer 3 reconvergence to minimize impact on revenue producing traffic
Multicast Support	Provides efficient support for new revenue producing multicasting applications in LAN, MAN, and WAN environments
Packet Prioritization	Provides expedited handling of packets generated by mission-critical applications as well as delay-sensitive real-time applications such as voice and video over IP
Dual Working Fiber Rings	Using two inter-connected linecards, dual working fiber rings maximize ring robustness and bandwidth capability
Topology Discovery and Routing Procedures	Plug-and-play capabilities minimize configuration requirements, optimize routing decisions for ring bandwidth maximization, and aid in network monitoring and management
Network Monitoring and Management	Maximize ring robustness and operational efficiency by providing SONET/SDH support, SRP MIB support, and MAC-layer counters for proactive monitoring and recovery and effective traffic-engineering capabilities
Pass-Through Mode Support	Maximizes ring robustness and bandwidth availability by avoiding ring wraps caused by soft, recoverable failures in router hardware or software
Transport Flexibility	Maximize deployment flexibility by operating via dedicated fiber, WDM wavelength, or as SONET/SDH tributary—thus matching both embedded and evolving infrastructure
Optics Options	Maximize application versatility and deployment flexibility by supporting single mode short- and long-reach optics

Table 2 Line Card Part Numbers

Product	Part Number
Single-Mode, Short-Reach Ring Line Card	OC-48/SRP-SR-SC-B
Single-Mode, Long-Reach Ring Line Card	OC-48/SRP-LR-SC-B
MATE Interface Cable (included with each line card)	CBL-SRP-OC48

Cisco IOS Software Release

- 12.0(11)S or later

Table 3 Optics Specifications

	Single-Mode Short Reach	Single-Mode Long Reach
Connector Type	SC duplex	SC duplex
Operating Wavelength	1310 nm	1550 nm
Transmit Power	–3 dBm (max.) –10 dBm (min.)	+3 dBm (max.) –2 dBm (min.)
Receive Power	0 dBm (max.) –18 dBm (min.)	–9 dBm (max.) –28 dBm (min.)
Worst-Case Reach	2 km	80 km

Layer 3 Packet Buffer Memory

- Default line card packet buffer memory of 128 MB/128 MB

Switch Fabric

- Requires full OC-48c/STM-16c fabric

LEDs

- Active, Carrier, Receive Packet, Pass Through, Wrap

Physical Specifications

- Each line card occupies a single slot
- Weight: 6 lb (2.7 kg)
- Height: 14 in. (35.6 cm)
- Depth: 18 in. (45.7 cm)

Environmental Specifications

- Operating temperature: 32 to 104 F (0 to 40 C)
- Storage temperature: –4 to 149 F (–20 to 65 C)
- Relative humidity: 10 to 90%, noncondensing

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