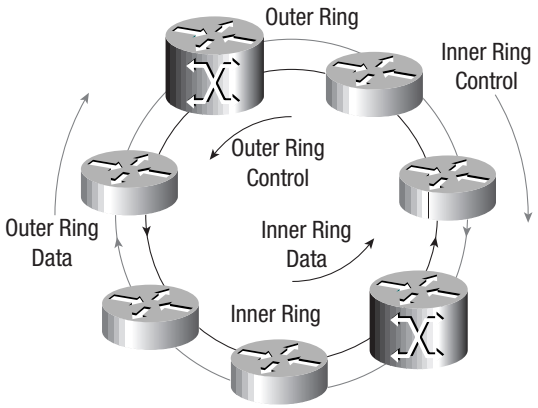
# *Dynamic Packet Transport Solution* **GSR 12000 OC-12c/STM-4c Packet Ring Line Card**

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.

DPT rings are dual, counter-rotating fiber rings. Both fibers are concurrently utilized to transport both data and control traffic as depicted below:

Figure 1 Dynamic Packet Transport




## Spatial Reuse Protocol (SRP)

SRP is the media independent 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 SONET/SDH, wavelength 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. The DPT line card also provides the choice of multimode, single-mode intermediate reach and single-mode 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 leverages optimal path selection, spatial reuse, statistical multiplexing and two working fibers to maximize the ring's traffic carrying capacity—and to minimize initial and growth costs. DPT rings also utilize the patent-pending 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 queueing and scheduling
- Multicasting
- MAC-based address filtering 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, multi-layer performance monitoring, fault detection and fault isolation capabilities. DPT provides sophisticated protection switching capabilities for responsive self-healing via the patent-pending 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 Card

## DPT Ring Applications

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

- Robust, high-bandwidth intraPoP 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

Ring Line Card Features and Benefits

| Feature | Benefit |
|---|---|
| **SRP Fairness and Spatial Reuse** | Maximizes ring packet carrying capacity, cost effectiveness and service stability via spatial reuse, statistical multiplexing and distributed, inter-nodal fairness |
| **Intelligent Protection Switching** | Maximize 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** | Maximize ring robustness and bandwidth carrying capability |
| **Topology Discovery and Routing Procedures** | Plug-and-play capabilities minimize configuration requirements, optimize routing decisions for ring bandwidth maximization, and aids in network monitoring and management |
| **Network Monitoring and Management** | Maximize ring robustness and operational efficiency by providing SONET/SDH MIB support and MAC layer counters for proactive monitoring and recovery and effective traffic engineering capabilities |
| **Pass-through Mode Support** | Maximize 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 multimode, and single-mode intermediate reach and long-reach optics |

Ring Line Card Part Numbers

| Product | Part Number |
|---|---|
| **Multimode Ring Line Card** | OC12/SRP-MM-SC-B |
| **Single-Mode, Intermediate Reach Ring Line Card** | OC12/SRP-IR-SC-B |
| **Single-Mode, Long Reach Ring Line Card** | OC12/SRP-LR-SC-B |
| **Single-Mode, Extra Long Reach Ring Line Card** | OC12/SRP-XR-SC |

## IOS Software Release

• 11.2(15)GS2+, 12.0(5)S or later

Optics Specifications

| | Multimode | Single-Mode Intermediate Reach | Single-Mode Long Reach | Single-Mode Extra Long Reach |
|---|---|---|---|---|
| **Connector Type** | SC duplex | SC duplex | SC duplex | SC duplex |
| **Operating Wavelength** | 1310 nm | 1310 nm | 1310 nm | 1550 nm |
| **Transmit Power** | -14 dBM (max.)<br>-20 dBM (min.) | -8 dBm (max.)<br>-15 dBm (min.) | +2 dBm (max.)<br>-3 dBm (min.) | +2 dBm (max.)<br>-3 dBm (min.) |
| **Receive Power** | -14 dBM (max.)<br>-26 dBM (min.) | -8 dBm (max.)<br>-28 dBM (min.) | -8 dBm (max.)<br>-28 dBm (min.) | -7 dBm (max.)<br>-28 dBm (min.) |
| **Worst Case Reach** | 2 km | 15 km | 40 km | 80 km |

## Layer 3 Packet Buffer Memory

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

## Transit Buffer Memory

• 512 KB

## Switch Fabric

• Requires full OC-48c/STM-16c fabric

## LEDs

• Active, Carrier, Receive Packet, Pass Through

## Physical Specifications

• Occupies single slot
• Weight: 6 lb. (2.7kg)
• Height:14 inches (35.6cm)
• Depth: 18 inches (45.7cm)

## Environmental Specifications

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