

## Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Line Card

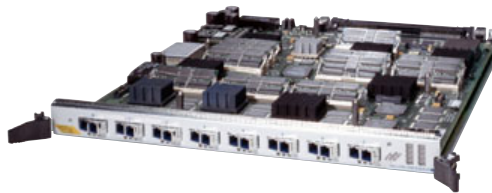
**The Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Line Card delivers performance and density while providing sophisticated IP quality of service (QoS) functionality and advanced traffic shaping.**

### Product Overview

Service providers face the challenge of meeting customer demand for high-density wire-speed Internet access via ATM while managing end-to-end QoS. The Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Line Card (8-Port OC-3 ATM) expands the connectivity options for the Cisco 12000 Series Internet Routers so that service providers can attach the routers directly to their existing ATM infrastructure. The 8-Port OC-3 ATM Line Card (Figure 1) supports advanced ATM traffic management features such as per-virtual circuit (VC) and per-virtual path (VP) traffic shaping, per-VC Weighted Random Early Detection (WRED), per-VC Modified Deficit Round Robin (MDRR), including low-latency queuing (LLQ), and non-real-time variable bit rate (nrt-VBR) and unspecified bit rate (UBR) ATM service classes. The segmentation and reassembly (SAR) of IP packets is performed in accordance with RFC 1483, Multiprotocol Encapsulation over ATM Adaptation Layer 5 (AAL5).

**Figure 1**

Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Line Card



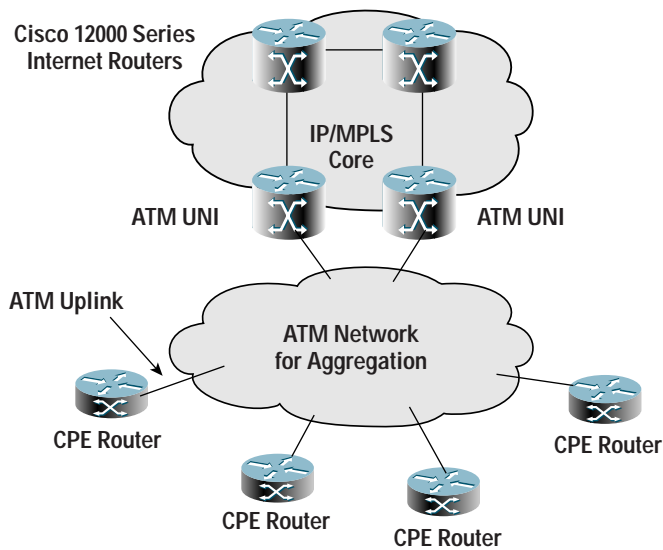
### Applications

The Cisco 12000 Series ATM line cards enable integration of ATM networks with next-generation IP backbones in numerous ways. The following provides several examples of how the ATM line cards for the Cisco 12000 Series can be used by service providers to build the most competitive IP and Multiprotocol Label Switching (MPLS) networks.

## ATM WAN Connectivity

With the use of the Cisco 12000 Series ATM line cards, service providers can offer Internet connectivity to enterprise customers via an ATM network (Figure 2).

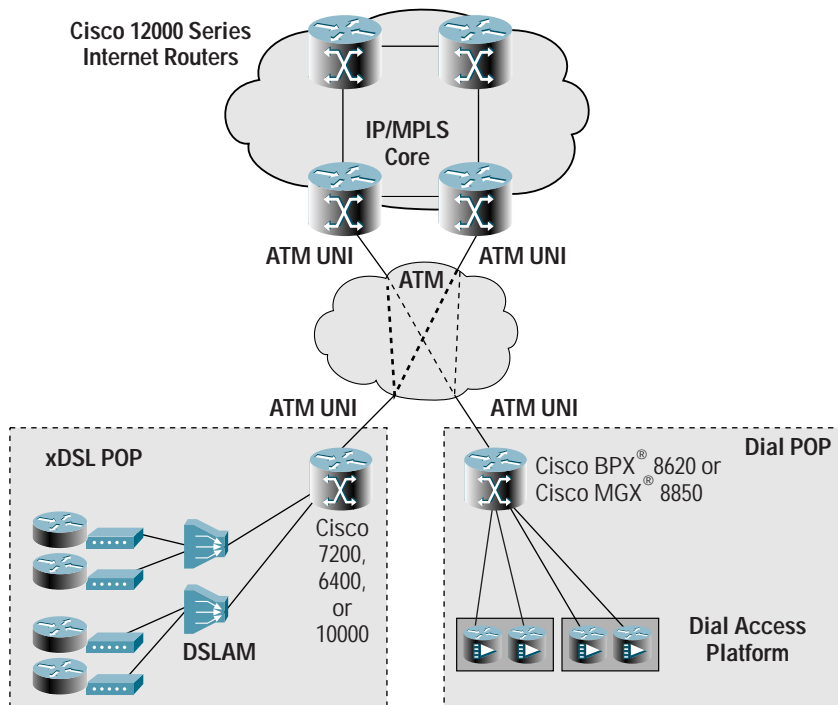
**Figure 2**  
ATM Network for WAN Services



## Low-Speed Access Aggregation

Using the Cisco 12000 Series ATM line cards, service providers can provide digital subscriber line (DSL)-based access or dial access services over an IP/MPLS core network (Figure 3).

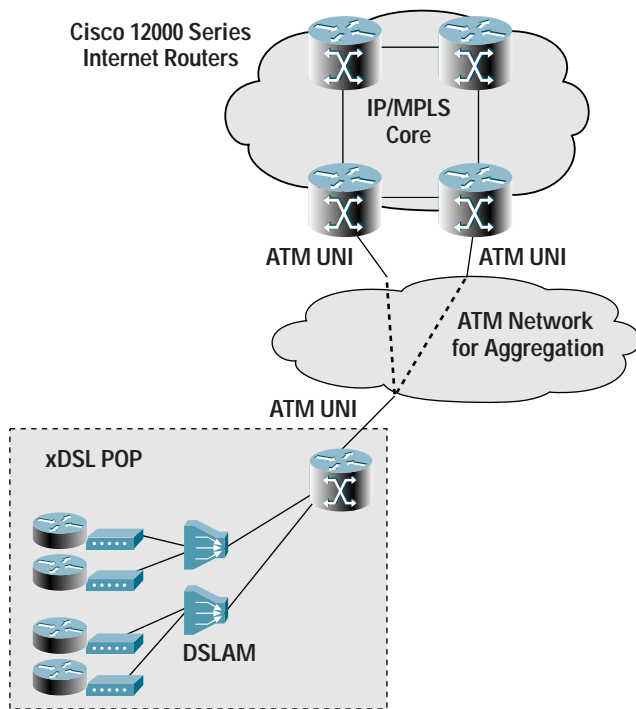
**Figure 3**  
Low-Speed Access Aggregation



## Business DSL Aggregation

Service providers who provide non-session-based (non-Point-to-Point Protocol [PPP]) DSL Internet access for business customers can connect to their Internet backbones via the Cisco 12000 Series ATM line cards (Figure 4).

**Figure 4**  
ATM Network for DSL Aggregation



### Key Features and Benefits

- *Per-VC and per-VP traffic shaping*—Traffic shaping is a function typically provided on ATM edge devices to ensure that bursty traffic conforms to a predetermined “contract.” To implement traffic shaping, the 8-Port OC-3 ATM Line Card supports per-VC and per-VP shaping, including unmatched  $n \times 64$ -kbps granularity, allowing flexibility and control over every VC and VP configured. Traffic shaping is supported on both nrt-VBR and UBR (via peak cellrate [PCR]) ATM service classes.
- *IP QoS features*—The 8-Port OC-3 ATM Line Card supports per-VC IP QoS features, allowing customers to apply advanced queuing and bandwidth management using WRED and MDRR, including LLQ, to individual VCs to avoid congestion and delay.
- *IP-to-ATM QoS mapping*—Also supported is setting IP-to-ATM QoS via the cell loss priority (CLP) bit. The VC bundling feature allows customers to divide traffic on different VCs according to the desired class of service (CoS).
- *Modular QoS command-line interface (MQC)*—For simplicity, QoS features are configurable using Cisco’s user-friendly MQC.

The Cisco 12000 Series Internet Router is part of Cisco’s family of multimillion packets-per-second (pps) IP and MPLS routing platforms for building profitable networks in today’s communications economy. The Cisco 12000 Series is the premier high-end routing platform for service provider backbone and edge applications, enabling service providers to meet the challenge of building packet networks to satisfy services demand while increasing profitability. The Cisco 12000 Series offers the only portfolio of 10 Gbps per slot systems and interfaces (including Packet over SONET [POS], Dynamic Packet Transport/Resilient Packet Ring [DPT/RPR], and Gigabit Ethernet [GbE]), delivering 10G economies of scale anywhere in the network. The Cisco 12000 Series provides the highest reliability, the richest set of service enablers, the lowest total cost of ownership, and the only proven investment protection, including systems that can be upgraded in the field to increase switching capacity. This innovative combination of features and capabilities enables service providers to build the most competitive IP and MPLS networks.

## Product Specifications

Table 1

| Product Specifications        |   |
|-------------------------------|---|
| <b>Chassis compatibility</b>  | <ul style="list-style-type: none"> <li>All Cisco 12000 Series chassis; no slot dependency</li> </ul>  |
| <b>Software compatibility</b> | <ul style="list-style-type: none"> <li>Cisco IOS® Software Release 12.0(22)S or higher</li> </ul>   |
| <b>Protocols</b>              | <ul style="list-style-type: none"> <li>Classical IP over ATM; client and ARP server [RFCs 1577, 1755, and 1626]</li> <li>Multiprotocol Encapsulation over AAL5 [RFC 1483] with support for LLC/SNAP, IP Mux and NLPID encapsulation</li> <li>UNI 3.0/3.1 (including ILMI)</li> <li>F4 and F5 OAM AIS/RDI alarms and loopback</li> <li>Default IP MTU for use over ATM AAL5 [RFC 1626]</li> <li>ATM signaling support for IP over ATM [RFC 1755]</li> <li>VBR-nrt; UBR (including optional PCR) ATM service classes</li> </ul>   |
| <b>Port density</b>           | <ul style="list-style-type: none"> <li>Eight OC-3c/STM-1c interfaces per line card, per chassis slot</li> </ul>   |
| <b>Connectivity</b>           | <ul style="list-style-type: none"> <li>Single mode, intermediate reach with SC type connector</li> <li>Multimode, short reach with SC type connector</li> </ul>   |
| <b>Optical specifications</b> | <p><b>Single mode Intermediate Reach</b></p> <ul style="list-style-type: none"> <li>Connector type: SC</li> <li>Wavelength: 1310 nm</li> <li>Fiber type: SMF</li> <li>Core size: 9/125 m</li> <li>Cable distance: 15 km</li> <li>Transmit power: -15 to -8 dBm</li> <li>Receive power: -28 to -8 dBm</li> </ul> <p><b>Multimode</b></p> <ul style="list-style-type: none"> <li>Connector type: SC</li> <li>Wavelength: 1310 nm</li> <li>Fiber type: MMF</li> <li>Core sizes: 62.5/125 m, 50/125 m</li> <li>Cable distance: 2 km</li> <li>Transmit power: -20 to -14 dBm (62.5-/125- m fiber)</li> <li>Transmit power: -23.5 to -14 dBm (50-/125- m fiber)</li> <li>Receive power: -30 to -14 dBm</li> </ul> |

## Product Specifications

|                                     |  |
|-------------------------------------|--|
| <b>Features and functions</b>       | <p><b>ATM layer</b></p> <ul style="list-style-type: none"><li>• Support for up to 2048 virtual circuits per port<sup>1</sup></li><li>• Support for up to 1024 virtual circuits per port with MDRR<sup>1</sup></li><li>• Support for up to 8 CoS queues per-VC, including one low-latency queue per-VC</li><li>• 16 VCI bits (0–64K) and 8 VPI bits (0–255) over any VPI/VCI combination within the full range</li><li>• Support for up to 250 VPs per port</li><li>• SVC signaling (point-to-point connections)</li><li>• SVC signaling (point-to-multipoint connections)</li><li>• UNI 3.0/3.1 (including ILMI)</li><li>• Multiprotocol encapsulation over AAL5</li><li>• Classical IP over ATM; client and ARP server</li></ul> <p><b>Traffic management</b></p> <ul style="list-style-type: none"><li>• UBR (including optional PCR)</li><li>• VBR-nrt</li><li>• Traffic shaping on a per-VC/VP basis (shaping granularity of n x 64K)</li><li>• Per-VC queuing/buffering</li><li>• Configurable queue depth</li><li>• Per-VC WRED</li><li>• Per-VC MDRR, including LLQ</li><li>• CLP bit setting</li></ul> <p><b>OAM</b></p> <ul style="list-style-type: none"><li>• F4 and F5 Operation, Administration and Maintenance (OAM)</li><li>• AIS/RDI alarms and loopback cell</li></ul> <p><b>Packet layer</b></p> <ul style="list-style-type: none"><li>• IP Version 4 (IPv4)</li><li>• IP Version 6 (IPv6)</li><li>• IP multicast forwarding</li><li>• Maximum Transfer Unit (MTU) of 9180 bytes</li><li>• Basic MPLS switching</li><li>• MPLS/VPN PE functionality</li><li>• MPLS CoS</li><li>• CsC and InterAS</li><li>• MPLS TE</li></ul> |
| <b>Security</b>                     | <ul style="list-style-type: none"><li>• Input ACLs per VC</li></ul>  |
| <b>Memory</b>                       | <ul style="list-style-type: none"><li>• 256 MB route memory</li><li>• 256 MB packet memory</li></ul>   |
| <b>Performance</b>                  | <ul style="list-style-type: none"><li>• 2.8 Mpps aggregated line rate</li><li>• Bi-directional OC-3c/STM-1c line rate forwarding for 64 byte packets (2 cells) on all 8 ports.</li></ul>   |
| <b>Environmental conditions</b>     | <p><b>Temperature</b></p> <ul style="list-style-type: none"><li>• Operating: 32° to 104°F (0° to 40°C)</li><li>• Storage: –4° to 149°F (–20° to 65°C)</li></ul> <p><b>Humidity</b></p> <ul style="list-style-type: none"><li>• Operating (noncondensing): 10 to 90%</li><li>• Storage (noncondensing): 5 to 95%</li></ul>  |
| <b>Reliability and availability</b> | <ul style="list-style-type: none"><li>• Non-service impacting online insertion and removal (OIR)</li><li>• Route Processor Redundancy Plus</li></ul>   |

## Product Specifications

|                           |  |
|---------------------------|--|
| <b>Network management</b> | <ul style="list-style-type: none"><li>• Modular QOS (MQC) command-line interface</li><li>• Simple Network Management Protocol (SNMP)</li><li>• ATM MIB [RFC1695]</li><li>• Cisco AAL5 MIB</li><li>• Cisco ATM EXT MIB</li><li>• IF MIB</li><li>• SONET MIB [RFC 1595] supported through SNMP</li><li>• Cisco IETF ATM2 PVCTRAP MIB</li><li>• MPLS TE MIB</li><li>• Cisco queue MIB</li></ul> |
| <b>Physical</b>           | <ul style="list-style-type: none"><li>• Weight: 7.5 lb (3.4 kg)</li><li>• Height: 14.5 in. (36.8 cm)</li><li>• Width: 1.25 in. (3.2 cm)</li><li>• Depth: 18.5 in. (45.7 cm)</li></ul>  |
| <b>Power</b>              | <ul style="list-style-type: none"><li>• 95 watts</li></ul>   |
| <b>LEDs</b>               | <ul style="list-style-type: none"><li>• Line Active LED</li><li>• Rx Carrier LED</li><li>• Rx Cells LED</li><li>• Alphanumeric management display</li></ul>  |

### Compliance and agency approvals

This product is designed to meet the following requirements (some qualifications in progress):

#### **SONET/SDH**

- Telcordia (Bellcore GR-253 as applicable)
- ITU-T G.957 as applicable
- ITU-T G.958 as applicable

#### **Safety**

- UL 1950
- CSA 22.2-No. 950
- EN60950
- IEC 60950 CB Scheme
- ACA TS001
- AS/NZS 3260
- EN60825/IEC60825 laser safety
- FDA—Code of Federal Regulations (USA) laser safety

#### **EMI**

- FCC CFR 47-PART 15 1998 Class A
- ICES 003 Class A
- AS/NZS 3548 Class A
- EN55022 Class B (up to 1 GHz)
- VCCI Class A
- CISPR 22 Class B (up to 1 GHz)
- BSMI/CNS 13438:1997 Class A
- IEC-1000-3-2 Power line harmonics
- IEC-61000-3-3 voltage fluctuations and flicker

#### **Immunity**

- IEC-1000-4-2 ESD (8kV contact, 15kV air)
- IEC-1000-4-3 radiated immunity (10 V/m)
- IEC-1000-4-4 EFT (2kV power port, 1kV signal port)
- IEC-1000-4-5 surge AC port (4kV CM, 2kV DM)
- IEC-1000-4-5 surge signal port (2kV CM, 1kV DM)
- IEC-1000-4-5 surge DC port (0.5kV CM, 0.5kV DM)
- IEC-1000-4-6 low-frequency conductive immunity (10V)
- IEC-1000-4-11 voltage dips and sags
- EN55024/CISPR24 ITE immunity

#### **NEBS**

- SR-3580—NEBS criteria levels (Level 3 compliant)
- GR-63-Core—NEBS physical protection
- GR-1089-Core—NEBS EMC and safety

#### **ETSI**

- EN 300 386/EN 300 386-2 Class B

<sup>1</sup> Subject to overall system configuration

## Ordering Information

| Description  | Part number       |
|--|-------------------|
| Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Single Mode Line Card | 8OC03/ATM/TS-IR-B |
| Cisco 12000 Series Eight-Port OC-3c/STM-1c ATM Multimode Line Card   | 8OC03/ATM/TS-MM-B |

## Service and Support

Cisco offers a wide range of service support offerings for its service provider 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 service provider 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 service providers customers.

## For More Information

For more information on Cisco service and support programs and benefits, visit [www.cisco.com/public/Support\\_root.shtml](http://www.cisco.com/public/Support_root.shtml)

For more information about the Cisco 12000 Series and the next generation of Internet Routers, visit [www.cisco.com](http://www.cisco.com), or call Cisco.



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