

Catalyst 5000 Family ATM DS3 Module

The Cisco Systems industry-standard Asynchronous Transfer Mode (ATM) DS3 module supports traffic shaping and traffic policing on a permanent virtual circuit (PVC) basis. This advanced functionality provides the ability to offer and enforce varying levels of class of service (CoS).

Using this module, network administrators can segment bandwidth based upon the virtual LAN (VLAN) identity of the data and gain control over traffic patterns within their network—a powerful tool. Because the ATM DS3 module can be used in any Catalyst® chassis (that is, the Catalyst 5000, 5002, 5500, and 5505), customers can deploy Catalyst switches as ATM edge devices where wirespeed traffic policing and traffic shaping is needed.

Example applications include:

- Transparent LAN services
- xDSL aggregation
- Web server farm

Figure 1 The Catalyst family ATM DS3 module offers cost-effective, high-performance wide area network connections using traffic-shaping capability



PVC Traffic Shaping Example Applications

The ATM DS3 module supports wirespeed, peak cell rate (PCR) traffic shaping on per-PVC RFC 1483 basis. The module provides up to ten PCR classifications and can support 4096 PVCs. Traffic shaping is performed on egress traffic from the ATM interface. The PVCs and corresponding PCRs can be bound to VLANs, so that different service levels can be offered on a per-PVC, per-VLAN basis. With this advanced functionality, network administrators can allocate bandwidth to critical network applications or segment data traffic as needed.

xDSL Aggregation

The demand for Internet connectivity and the resultant increase in bandwidth requirements is driving the development of xDSL deployment. Asymmetric digital subscriber line (ADSL) technology provides end users up to 640 Kbps upstream and 9 Mbps downstream into the Internet. As xDSL technology matures, bandwidth capabilities will expand. The ability to tariff based upon bandwidth is an economic reality for xDSL telco and Internet service providers (ISPs).

The Catalyst 5000 family with its high-density Ethernet interfaces and PVC traffic shaping code provides cost-effective xDSL aggregation with the added enhancement of bandwidth allocation.

Transparent LAN Services

In addition to xDSL services, many telcos are providing transparent LAN services to their customers. Transparent LAN services provide a 10BaseT, Fiber Distributed Data Interface (FDDI), Fast Ethernet, or Token Ring connection to customers that extends across a metropolitan-area network (MAN). From the customers' perspective, transparent LAN services provide a native LAN connection to their remote sites. Telcos provide this capability by utilizing their installed fiber wiring base to interconnect the customer sites.

Internet Service Provider Web Server Farms

Many ISPs provide Web server services to their customer base. By utilizing the ATM PVC traffic shaping software, ISPs can tariff different service rates to their clients' Web servers.

Fault Tolerance and Troubleshooting Capability

OAM Loopback—Operation, Administration, and Maintenance (OAM) cells are transmitted over ATM virtual channel connections (VCCs) to verify VCC connectivity. The Catalyst 5000 ATM DS3 module, which automatically responds to F5 loopback cells, can be configured to generate these cells. OAM operation provides a method to validate ATM connectivity independent of Layer 3 capabilities such as an IP ping.

Dual-Homed ATM—Dual PHY DS3 ATM allows network administrators to deploy redundant connections from one uplink port. Similar to Fiber Distributed Data Interface (FDDI) dual homing, the Catalyst 5000 family ATM DS3 module provides link redundancy by duplicating the data link with a primary and secondary interface. If connectivity is lost on the primary interface because of link failure, data connectivity automatically switches over to the redundant, secondary interface.

Feature Summary

Feature Category	Feature	Function	Benefit
Class of Service	PVC Traffic Shaping	Allows the user to configure up to ten rate classifications for segmentation of outgoing ATM bandwidth on a PVC	Different service levels on a per-VLAN basis; bandwidth allocation to critical network applications
Troubleshooting	OAM Ping	Performs standard loopback (end-to-end or segment) and fault detection for each connection	Verifies link connectivity, independent from IP or Layer 3
Fault Tolerance	Dual PHY	Data connectivity automatically switches to redundant link	Link connectivity is preserved even if the primary interface fails
WAN Connectivity	ATM DS-3	Enables connection into ATM PVC wide area network	Provides ATM WAN connectivity to remote switches

Other Features at a Glance

- Can be hot-swapped or added as needed without resetting the Catalyst 5000 family switch
- Connectivity from switched Ethernet and Fast Ethernet to ATM backbones with added enhancement of bandwidth allocation
- Wirespeed performance
- Superior traffic management with 256 transmit buffers to accommodate bursty traffic
- Limits the maximum number of buffers/packets queued on a VC to 20 to avoid one (slow) VC allocating all the buffers
- Supports multiple active Media Access Control (MAC) addresses (up to 16,000)
- Supports Spanning-Tree algorithm on logical VLANs for fault-tolerant connectivity
- Supports up to 1000 VLANs between Catalyst 5000 series switching platforms and Cisco routers

ATM DS3 Module Specifications

Physical Specifications

- Occupies one slot in the Catalyst 5000 platform
- Dimensions (H x W x D): 1.2 x 14.4 x 16 in. (3 x 35.6 x 40.6 cm)

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%, noncondensing

Agency Approvals

- FCC Part 15 (CFR 47) Class A
- UL 1950
- CSA 950

Memory

- Flash memory: 4 MB
- DRAM: 16 MB
- Erasable programmable read-only memory (EPROM): 512 KB
- Nonvolatile RAM (NVRAM): 128 KB

Processors

- ATM control processor: Motorola 68EC030
- Segmentation and reassembly (SAR): Two LSI AToMizer 50-MHz RISC processors

Frame-to-Cell Conversion

- ATM adaption layer 5 (AAL5)
- 4096 Virtual circuits

ATM Standards

- RFC 1483 Logical Link Control (LLC) Subnetwork Access Protocol (SNAP) bridging encapsulation (permanent virtual circuit [PVC]) for Ethernet frames

Network Management

- Definitions of Managed Objects for Bridges (RFC 1493)
- Evolution of Interfaces Group of MIB-II (RFC 1573)
- Cisco Discovery Protocol
- Simple Network Management Protocol (SNMP) Management Information Base (MIB) II (RFC 1213)
- Cisco Workgroup Stack MIB
- Managed Objects for PVC management and configuration
—CISCO ATM PVC MIB

Indicators

- Module status: green (operational)/red (faulty)
- Link status: green (operational)
- Port active status: green (operational)
- RX: green flashing (receive activity)
- TX: green flashing (transmit activity)

Interface Specification

- Data Rate: 44,736 Mbps
- Media: Coaxial
- Connector: BNC
- Line Encoding: B3ZS
- Framing: C-bit parity, optionally PLCP with M23, otherwise ADM (ATM Framing)
- Timing: Primary and secondary 8-kHz reference from internal (default) or network
- Loopbacks: Transmit and receive loopbacks
- Impedance: 75 ohms nominal



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