

## Catalyst Family 5000 Multi-Layer Switching Solutions

NetFlow LAN Switching provides wire-speed Layer 3 switching by extending the NetFlow Technology, an integral part of Cisco IOS™ software, to LAN switching hardware. NetFlow LAN Switching is enabled on the Catalyst® 5000 series LAN switches by a simple upgrade to the Supervisor Engine.

### Wire-Speed Multilayer Switching

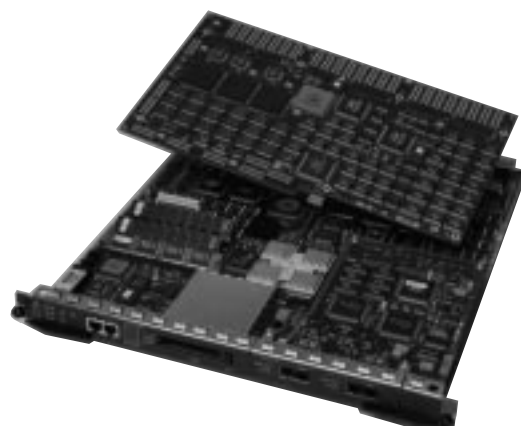
NetFlow LAN Switching enables wire-speed Layer 3 switching with the full support of Cisco IOS routing protocols and services with the delivery of critical services such as access lists and class of service (CoS) differentiation, while also providing integrated flow management for identifying traffic characteristics for administration, planning, and troubleshooting.

### NetFlow LAN Switching Elements

The system-level components of NetFlow LAN Switching are:

- The award-winning Catalyst 5000 series of LAN switches
- The Catalyst route switch module (RSM), which provides Cisco IOS-based multiprotocol routing and network services
- The NetFlow Feature Card, which is a modular feature-card upgrade for the Catalyst 5000 Supervisor, providing hardware-based Layer 3 switching

The NetFlow Feature Card is a Modular Upgrade to the Catalyst Supervisor Card



### Layer 3 Backbone Switching

Using these elements, NetFlow LAN Switching provides packet-by-packet Layer 3 switching at performance rates of millions of packets per second. The NetFlow feature card identifies flows by using both network-layer and transport-layer information, and it switches packets between subnets by using advanced application-specific integrated circuit (ASIC) switching hardware. The RSM performs the route processing and central configuration and control for the NetFlow LAN Switching Catalyst switch. NetFlow LAN Switching uses standard routing protocols such as Open Shortest Path First (OSPF), Interior Gateway Routing Protocol (IGRP), Enhanced IGRP (EIGRP), and Routing Information Protocol (RIP) for route determination. NetFlow LAN Switching is standards based and is transparent to the end station, requiring no software or hardware changes.

It supports network services such as DHCP, BOOTP and multicast services such as IGMP and CGMP, across existing subnet structures at wire speeds.

### Integrated NetFlow LAN Switching Management

NetFlow LAN Switching enhances the management capabilities of the Catalyst series of switches by providing comprehensive Layer 3 monitoring of all intersubnet traffic passing through the NetFlow feature card. The NetFlow feature card keeps detailed statistics for each flow switched, including source/destination IP address, TCP/User Datagram Protocol (UDP) port number, number of packets and bytes switched in the flow, and time stamp information. This capability complements the embedded Remote Monitoring (RMON) capabilities already available on a per-port basis, which provides detailed, Layer 2 information.

Integrated NetFlow LAN Switching management includes a family of products, management utilities, and partner applications designed to gather flow statistics, export the statistics using NetFlow LAN Switching data export, collect and perform data reduction, and finally pass the data to consumer applications for traffic monitoring, planning, and accounting. Flow collectors such as a Cisco SwitchProbe™ device and NetFlow collector gather and classify flows. The information is then aggregated and fed to consumer applications such as CiscoWorks for Switched Internetworks (CWSI) or Cisco's Netsys

modeling tool. The flow statistics gathered in the data collection phase enable several key customer applications and benefits:

- **User monitoring and profiling**—Gain detailed understanding of user utilization of network and application resources. This information can then be used to efficiently plan and allocate resources.
- **Application monitoring and profiling**—Gain a detailed view of application traffic patterns over the network. For example, the network administrator can see the percentage of traffic used by the Web, File Transfer Protocol (FTP), Telnet, and other well-known TCP/IP applications.
- **Network monitoring**—Enables network monitoring capabilities. RMON, RMON-2, and flow-based analysis techniques can be used to visualize traffic patterns associated with individual switches as well as on a network-wide basis and provide proactive problem detection, efficient troubleshooting, and rapid problem resolution.
- **Network planning**—Provides key information for sophisticated tools such as those from Cisco's Netsys to optimize strategic network planning.
- **Accounting/billing**—Provides metering (for example, flow data, including details such as IP addresses, packet and byte counts, time stamps, application ports) for flexible resource utilization accounting. Enterprise customers can use the information for departmental chargeback or cost allocation for resource utilization.

### Wiring Closet Multilayer Services

In addition to the performance benefits of wire-speed Layer 3 switching, for the Campus backbone the NetFlow feature card offers advanced, multilayer services geared for the wiring closet, including the following:

- **Protocol filtering**—On a port-by-port basis, the NetFlow feature card can filter broadcast traffic by protocol, resulting in more efficient use of bandwidth for end stations. For example, IP-only workstations will not receive broadcasts from “chatty” protocols such as IPX Service Advertisement Protocol (SAPs), and RIPS. In addition, protocol filtering is automatically set up by system software so that there is no configuration overhead for the network manager.

- **Enhanced multicast suppression**—The NetFlow feature card can be used to prune IP multicast traffic to only those ports that are members of a designated multicast group. This scenario results in more bandwidth to the end user as well as more efficient use of the workstation's CPU.
- **Efficient multicast**—With a Supervisor Engine software upgrade, the NetFlow feature card provides hardware-based duplication of IP multicast packets destined for multiple subnets. This feature offloads the RSM from duplicating and transmitting multicast packets, allowing it to provide other value-add services such as Resource Reservation Protocol (RSVP), and QoS services.

## Technical Specifications

### IEEE Standards

- Ethernet: IEEE 802.3, 10BaseT, and 10BaseFL
- Fast Ethernet: IEEE 802.3u, 100BaseTX, 100BaseFX
- Gigabit Ethernet: IEEE 802.3z, 1000Base SX, LX

### Protocol Support

- NetFlow feature card-IP, RSM- IP, IPX, AT, DECnet, VINES, Systems Network Architecture (SNA), Protocol Independent Multicast (PIM), Hot Standby Router Protocol (HSRP)

### Physical Specifications

- Daughtercard for Catalyst 5000 Supervisor Engine
- Dimensions (H x W x D): .093 x 8.2 x 14.2 in (2.36 x 208.3 x 360.68 cm)

### Environmental Conditions

- Operating temperature: 32 to 104 F (0 to 40 C)
- Storage temperature: -40 to 167 F (-40 to 75 C)



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- Relative humidity: 10 to 90%, noncondensing