

Cisco IOS 12.0(17)SL Release on Cisco 10000 Series

Product Description

Cisco IOS[®] 12.0(17)SL includes a new set of PXF accelerated features for the Cisco 10000 Series.

The traditional Internet access model delivers only basic connectivity and “best-effort” transport. It does not offer the revenue-generating opportunities that are necessary to compete in today’s internetworking industry. Internet service providers (ISPs) are realizing the importance of value-added services that attract new customers, retain existing customers, and generate much needed revenue. ISPs can offer “differentiated services” using the Parallel eXpress Forwarding (PXF) accelerated quality-of-service (QoS) features of the Cisco 10000 Series. With the introduction of the Cisco IOS 12.0(17)SL Software release, the Cisco 10000 Series provides a flexible and scalable framework for implementing traffic management and QoS functionalities, in addition to other features such as 802.1Q and enhanced Multilink PPP (MLPPP).

Key Features

With Release 12.0(17)SL, the following features are added:

- User defined queues. These are configured with the new QoS modular command-line interface (CLI)
- Class-Based Weighted Fair Queuing (CB-WFQ)
- Priority Queuing/Low-Latency Queuing (PQ/LLQ)
- Generic traffic shaping (GTS)
- Frame Relay traffic shaping (FRTS)
- 802.1Q
- Performance Enhancements

- MLPPP
- ACLs
- Per-Packet Load Balancing
- Class of service (CoS)

Key Benefits

User Defined Queues—QoS Modular CLI

This release of software adds the capability for network operators to specify queues using the new QoS Modular CLI. Modular CLI was developed to provide a more flexible and scalable means of applying QoS policies, versus the time consuming and error-prone use of many repetitive ACLs to accomplish the same task. Modular CLI is a more intuitive, easier and therefore more scalable way to configure QoS. The modular CLI is based on the introduction of three new kinds of *maps*:

- *Class map* provides a variety of keywords for packet classification. These keywords can match specific packet attributes such as protocol or Media Access Control (MAC) address, or they can trigger access-list matches. The result of a class map is to place a packet in a user-named class.
- The *policy map* provides a place to specify the actions that should be taken on packets after they have been classified. Examples of actions are rate limiting (as in committed access rate [CAR]), dropping, fancy queuing, and changes to the precedence field.
- The *service map* associates a policy map with an interface.

CB-WFQ—14 Class-Based Queues

Release 12.0(17)SL increases the number of class-based queues supported on the Cisco 10000 Series to 14. CB-WFQ is a class-based queuing algorithm used to schedule interactive traffic to the front of the queue to reduce response time. It fairly shares the remaining bandwidth between the other flows. WFQ ensures that queues do not starve for bandwidth, and that traffic gets predictable service. Low-volume traffic streams—which comprise of mostly traffic—receive preferential service, transmitting their entire offered loads in a timely fashion. High-volume traffic streams share the remaining capacity proportionally between them. With CB-WFQ, a service provider can allocate a share of a link to several different classes of traffic, identified by the type-of-service (ToS) field in the IP packet header, or by an access-list check.

PQ/LLQ

PQ/LLQ is useful for ensuring that mission-critical traffic traversing various WAN links gets priority treatment. Release 12.0(17)SL for the Cisco 10000 Series includes a low latency queue implemented specifically for voice traffic. Network operators can now ensure that delay-sensitive VoIP packets get preferential treatment and are queued and sent first before other traffic in other queues.

Frame Relay Traffic Shaping and Generic Traffic Shaping

Release 12.0(17)SL introduces the support of traffic shaping on the Cisco 10000 Series. Network operators use traffic shaping to manage network congestion by grooming traffic for the most efficient downstream transport.

Generic traffic shaping (GTS) provides a mechanism to control the traffic flow on a particular physical interface or sub-interface. It reduces outbound traffic flow to avoid congestion by constraining specified traffic to a particular bit rate while queuing bursts. Thus, traffic adhering to a particular profile can be shaped to meet downstream requirements, eliminating bottlenecks in topologies with data-rate mismatches.

Note: The Cisco 10000 Series implementation does not support the adaptive commands. GTS may be used in a variety of layer technologies, including Frame Relay, ATM, and Ethernet.

For Frame Relay interfaces, FRTS may be applied to enqueue traffic into per-DLCI queues and shape each of these as desired. In Release 12.0(17)SL, up to 255 shaped DLCIs are supported.

On the Cisco 10000 Series FRTS is the traffic-shaping tool used on Frame Relay interfaces. Using FRTS, service providers can organize traffic into per-data-link connection identifier (DLCI) queues, and shape each DLCI separately.

802.1Q VLAN Support

Release 12.0(17)SL adds 802.1Q VLAN support to the Cisco 10000 Series. Service providers can use 802.1Q VLANs on gigabit Ethernet interfaces to provide isolation between different content providers' traffic. 802.1Q VLANs may be mapped to MPLS VPN, maintaining traffic separation across an MPLS infrastructure.

Performance Enhancements

MLPPP

MLPPP has been supported on the Cisco 10000 Series as of the platform FCS, but Release 12.0(17)SL offers a performance improvement. MLPPP offers a standard-based mechanism to bridge the gap between T1/E1 at 1.5/2.0 Mbps and DS3/E3 at 45 Mbps. Configuration of MLPPP is supported on all of the channelized interface cards (6xDS3, 1xOC12, 4xSTM1). In addition, MLPPP is supported across the entire chassis. In other words, T1s or E1s can be bundled together regardless of which physical interface or interface card they are connected to.

ACL Handling

Release 12.0(17)SL offers improved performance for handling ACLs. The PXF algorithms can now handle up to 32,000 unique basic Access Lists, with up to 4 entries each. Comprised of up to 16,000 input with up to 4 entries each and 16,000 output with up to 2 entries each. Due to the characteristics of the PXF engine, and the utilization of the turbo ACL algorithms, ACL performance is extremely consistent, regardless of ACL size. In typical configurations, ACLs can be processed at rates above 2Mpps.

Per-Packet Load Balancing

Load balancing deals with the capability to divide data traffic over multiple equal-cost connections. Load balancing can be supported in several ways. The Cisco 10000 Series currently supports “per-destination” load balancing where path choice is

made based on the destination address. Cisco IOS 12.0(17)SL adds “per-packet” load balancing. Per-packet load balancing is a simple to configure alternative that uses round-robin techniques to select the output path without basing the choice on the packet content. Per-packet load balancing is already optimized on the Cisco 12000 Series so PXF accelerating this feature on the Cisco 10000 Series is an important interoperability step, enabling network operators to implement the load balancing option of their choice between their core and edge routers.

CoS Performance Enhancements:

Class of IP Precedence Service processing algorithms have been enhanced to provide parallel classification for up to four or IP Differentiated Service Code Point (DSCP) values. Specifically matches four of the following types can be processed in parallel: IP Precedence, IP DSCP, qos_group, IP RTP port range and ‘match any’. This means that one could, for example, create traffic classes for “voice,” “Gold,” “Bronze” and “Silver,” plus the default (best effort) data class, and that these would be evaluated and processed in the PXF with no impact to forwarding performance.

Ordering Information

Platform	Product Description	Product Code	Image	Flash	DRAM
Cisco 10000	Cisco 10000 Series IOS service provider/ secured shell 56	S10K3Z-12.0.17SL	c10k-k3p6-mz	40 MB	512 MB
Cisco 10000	Cisco 10000 Series IOS service provider/ secured shell 3DES	S10K4Z-12.0.17SL	c10k-k4p6-mz	40 MB	512 MB
Cisco 10000	Cisco 10000 Series IOS (p6)	S10KIP-12.0.17SL	c10k-p6-mz	40 MB	512 MB



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