

# Cisco IOS Software Release 12.0(23)SX for Cisco 10000 Series

This product bulletin describes new features introduced in Cisco IOS® Software Release 12.0(23)SX for the Cisco 10000 Series.

- It will run only on PRE1 (P10 image only). There will be no support for PRE-based forwarding engines.
- It will have feature parity with Release 12.0(23)S and will offer some additional features.
- Release 12.0(23)SX will be classed as a “limited availability” release until Cisco IOS Release 12.0(26)S is posted.

## New Features in Cisco IOS Software Release 12.0(23)SX

The following features and improvements are newly supported in Cisco IOS Release 12.0(23)SX.

- Three Color Policing
- FRF.12 Fragmentation
- MLPPP Fragmentation
- Multiprotocol Label Switching (MPLS) Traffic Engineering Fast Reroute for Cisco 10000 Series packet-over-SONET (POS) line cards
- DiffServe-Aware Traffic Engineering
- IBGP/eiBGP Load Sharing
- Multi-Router APS (MR-APS) for the Cisco 10000 Series OC-12 ATM line card
- IP Multicast over MPLS VPN
- Trap Filtering
- MIB enhancements

## Upgrade Path

Release 12.0(23)SX will be classed as a “limited availability” release until Cisco IOS Release 12.0(26)S is posted. For bug fixes, customers will be expected to upgrade to releases 12.0(24)S, 12.0(25)S, or 12.0(26)S, depending on the feature. Table 1 provides the upgrade information.

**Table 1** Upgrade Path per Feature

Feature	Upgrade Path (First Cisco IOS Release Available)
<b>Three Color Policing</b>	12.0(25)S
<b>FRF.12 Fragmentation</b>	12.0(25)S
<b>MLPPP Fragmentation</b>	12.0(25)S
<b>MPLS Traffic Engineering Fast Reroute for Cisco 10000 Series POS line cards</b>	12.0(26)S
<b>DiffServe Aware Traffic Engineering</b>	12.0(24)S
<b>IBGP/eiBGP Load Sharing</b>	12.0(24)S
<b>Multi-Router APS (MR-APS) for the Cisco 10000 Series OC-12 ATM line card</b>	12.0(26)S
<b>IP Multicast over MPLS VPN</b>	12.0(25)S
<b>Trap Filtering</b>	12.0(24)S
<b>MIB enhancements</b>	12.0(26)S



### **Three Color Policer**

Starting in Release 12.0(23)SX, the Cisco 10000 Series supports a single-rate, three-color marker. A two-color marker (previously supported on the Cisco 10000 Series) meters a traffic stream classifying it into two groups (or colors): the traffic conforming to the specified Committed Information Rate (CIR) and the burst parameters, and the traffic exceeding either the CIR or the burst parameters. A three-color marker classifies the metered traffic into three groups, adding an additional color for the nonconforming traffic. The three-color marker distinguishes between the nonconforming traffic that occasionally bursts a certain number of bytes more than the CIR allowance and the traffic that extendedly violates the CIR allowance. A three-color marker affords such applications as that requires three service levels: guaranteed, best effort, and deny. A three-level policer enables the Cisco 10000 Series to comply with DiffServ Specs (RFC 2597 and RFC 2598).

### **Link Fragmentation and Interleaving for Frame Relay (FRF.12)**

On low-speed serial links, a large packet can cause latency for smaller packets, such as voice packets. Developed primarily for links running at 768 kbps or less, link-level fragmentation can prevent increased latency (and jitter) by dividing the large data packets into smaller pieces and interleaving voice packets within those fragments. FRF.12 is specifically designed to operate on Frame Relay encapsulated low speed interfaces. This feature is supported across all Cisco 10000 Series line cards that support Frame Relay encapsulation.

### **Link Fragmentation and Interleaving for Multilink PPP (LFI)**

Link Fragmentation and Interleaving for MLPPP has the same benefits as FRF.12 except over links running PPP encapsulation. This feature addresses fragmentation for bundles containing a single link on the Cisco 10000 Series. The feature complies with RFC 1717.

### **MPLS Traffic Engineering Fast Reroute Link Protection for the Cisco 10000 Series POS Line Cards**

This Layer 3 high-availability enhancement allows for the notion of primary and backup label switched paths (LSPs) within the MPLS core. The feature provides temporary routing around a failed link within the network. Upon failure (such as a loss of signal), a “path error” failure is sent to the tunnel headend and the logical LSP is rerouted to the next hop over a preconfigured backup LSP/tunnel. No manual reconfiguration is required.

### **DiffServe Aware Traffic Engineering**

DiffServe Aware Traffic Engineering extends the DiffServ quality of service (QoS) model over an MPLS backbone configured with Traffic Engineering. This technology uses the notion of “bandwidth pools” associated with tunnel interfaces and ensures that critical data is associated with a tunnel having sufficient bandwidth to deliver the application across the MPLS core network.

### **IBGP/eiBGP Load Sharing**

IBGP/eiBGP Load Sharing is an enhancement to BGP that enables load sharing over parallel links between customer edge routers and service provider edge routers. Further, this feature enables service providers to share customer traffic loads over parallel paths within an MPLS core network.



### **Multi-Router APS (MR-APS) for the Cisco 10000 Series OC-12 ATM Line Card**

Multi-Router APS extends the capabilities of SONET Automatic Protection Switching (APS) to include coverage for links between a pair of routers. “Working” and “protected” SONET links may now emanate from different routers to a common add-drop multiplexer (ADM). This feature enhances the Cisco 10000 Series’ High Availability capabilities to include support for a failed network element, rather than just a failed link or module.

### **IP Multicast over MPLS VPN**

MPLS VPN enables customers to extend their MPLS VPN capabilities to support multicast traffic in a VPN. A VPN customer is now able to extend multicast applications between disparate sites over the MPLS VPN.

### **Trap Filtering**

If an interface on a Cisco 10000 Series router goes down, then the subinterfaces of that link will also go down. This can cause numerous link-down traps to be sent for each subinterface. Trap filtering enables the filtering of link-down traps such that only the main interface link-down trap is sent.

### **MIB Enhancements**

The following network management enhancements have been added to the Cisco 10000 Series:

#### **MIBs added:**

- CISCO-OAM-MIB
  - This MIB is used to support configuring and displaying information for cell-based OAM loopback tests (OAM ping tests).
- CISCO-ENTITY-EXT-MIB
  - This MIB is an extension of the ENTITY-MIB and contains information for entities of class “module.”

#### **MPLS enhancements:**

- MPLS-LSR-MIB
  - Enhancements to the Parallel Express Forwarding (PXF) microcode have included per-tag octet counters. The addition of this MIB brings in support for mplsInSegmentOctets and mplsOutSegmentOctets
- IF-MIB enhancements for MPLS Layer
  - The Interfaces MIB (RFC 2233) is enhanced to support MPLS layer statistics.
- MIBs Synched Between the Active and Standby PRE:
  - ENTITY-MIB
  - IF-MIB

### **MIBs Supported by Cisco IOS Release**

To determine which MIBs are included in the Cisco IOS Software release running on the Cisco 10000 Series, follow the instructions below.

- Step 1.** Go to the Cisco MIBs Support page on Cisco.com (<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>).
- Step 2.** Under Cisco Access Products, select Cisco 10000 Series. The system displays a list of MIBs included in the selected Cisco IOS Software release.



**Step 3.** Scroll through the list to find the release you are interested in.

### Detailed MIB Enhancement Information

For MIB specifications, implementation constraints and trap details, see the *Cisco 10000 Series MIB Specifications Guide* at:  
[http://www.cisco.com/en/US/products/hw/routers/ps133/products\\_mib\\_quick\\_reference\\_chapter09186a00804d37f1.html](http://www.cisco.com/en/US/products/hw/routers/ps133/products_mib_quick_reference_chapter09186a00804d37f1.html)

For a list of MIBs supported by each Cisco product, refer to:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

### Product Numbers

**Table 2** Cisco IOS Software Release 12.0(23)SX Feature Sets, Images, and Memory Recommendations

Platform	Software Feature Set	Product Code	Image	Flash	DRAM
Cisco 10000 Series	Cisco 10000 Series IOS SERVICE PROVIDER/ SECURED SHELL 3DES	S10KK5Z1-12.0.23SX	C10k-p10-mz	48 MB	128 MB
Cisco 10000 Series	Cisco 10000 Series IOS EDGE SERVICES ROUTER	S10KZ1-12.0.23SX	C10k-k4p10-mz	48 MB	128 MB

### Download Information

Customers can download Cisco IOS Software Release 12.0(23)SX software from Cisco.com in the software image library:  
<http://www.cisco.com/kobayashi/sw-center/sw-ios.shtml>

### Additional Sources

For additional information about Cisco IOS Software Release 12.0(23)SX, please refer to the following sources:

Release Notes for Cisco IOS Release 12.0(23)SX are located at:

<http://www.cisco.com/univercd/cc/td/doc/product/aggr/10000/10krn/index.htm>

Cisco 10000 Series MIB Specifications Guide is located at:

[http://www.cisco.com/en/US/products/hw/routers/ps133/products\\_mib\\_quick\\_reference\\_chapter09186a00804d37f1.html](http://www.cisco.com/en/US/products/hw/routers/ps133/products_mib_quick_reference_chapter09186a00804d37f1.html)



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LS/LW4002 12/02