

Feature Sets

These sections describe the feature sets in Release 12.2SX:

- [Feature Set Guidelines and Restrictions, page 115](#)
- [Feature Set Descriptions, page 115](#)

Feature Set Guidelines and Restrictions

These are the feature set guidelines and restrictions:

- The FlexWAN and Enhanced FlexWAN modules and SIPs and SPAs are supported only in images that contain “_wan” in the image name.
- This product bulletin explains the feature sets used in Release 12.2(18)SXE and later releases:
http://www.cisco.com/en/US/prod/collateral/iosswrel/ps8802/ps5460/prod_bulletin0900aecd80281b17_ps708_Products_Bulletin.html
- The releases includes strong encryption images. Strong encryption images are subject to U.S. and local country export, import, and use laws. The country and class of end users eligible to receive and use Cisco encryption solutions are limited. See this publication for more information:
http://www.cisco.com/web/about/doing_business/legal/global_export_trade/general_export/contract_compliance.html
- Some TFTP server implementations cannot transfer 16 MB or larger files. To transfer 16 MB or larger files, you might need to use FTP or rcp. See this online publication for procedures:
http://www.cisco.com/en/US/docs/ios/12_2/configfun/configuration/guide/fcf008.html

Feature Set Descriptions

This section lists all of the features that are unique to each feature set and some of the features that are common to all feature sets.

Feature Name	IP Base	IP Services	Advanced IP Services	Enterprise Services	Advanced Enterprise Services
TCP Intercept					X
IPsec Network Security			X		X
Note • The SPA-IPSEC-2G supports IPsec Network Security in hardware. • Without a SPA-IPSEC-2G, the IPsec Network Security feature (configured with the crypto ipsec command) is supported in software only for administrative connections to Catalyst 6500 series switches.					
MPLS			X		X
IPsec VPNs			X		X

Feature Name	IP Base	IP Services	Advanced IP Services	Enterprise Services	Advanced Enterprise Services
ISO CLNS				X	X
Novell IPX				X	X
IPv6					
With releases earlier than Release 12.2(33)SXI:			X	X	X
With Release 12.2(33)SXI and later releases:	X	X	X	X	X
Cisco IOS server load balancing (SLB)		X	X	X	X
IS-IS			X	X	X
VSS					
With releases earlier than Release 12.2(33)SXI1:		X	X	X	X
With Release 12.2(33)SXI1 and later releases:	X	X	X	X	X
BGP4		X	X	X	X
MBGP		X	X	X	X
VRF Lite		X	X	X	X
Bidirectional PIM		X	X	X	X
EIGRP		X	X	X	X
MSDP		X	X	X	X
OSPF	X	X	X	X	X
Note CSCth76325 prevents support of OSPFv2 in IOS IP Base images in Release 12.2(33)SXI4. Release 12.2(33)SXI4 Software Modularity IP Base images support OSPFv2.					
PBR		X	X	X	X
NetFlow	X	X	X	X	X
EIGRP Stub Routing	X	X	X	X	X
HSRP	X	X	X	X	X
IGMP	X	X	X	X	X
IPsec Triple DES Encryption (3DES) for SSH	X	X	X	X	X
Note The SSH k9 images support SSH 3DES access in software on the route processor.					
PIMv1, PIMv2	X	X	X	X	X
RIPv1, RIPv2	X	X	X	X	X

New Features

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- [New Features in Release 12.2\(33\)SXJ5, page 118](#)
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- [New Features in Release 12.2\(33\)SXJ3, page 119](#)

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- [New Features in Release 12.2\(33\)SXJ1, page 121](#)
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- [New Features in Release 12.2\(33\)SXI1, page 133](#)
- [New Features in Release 12.2\(33\)SXI, page 133](#)
- [New Features in Release 12.2\(33\)SXH8b, page 142](#)
- [New Features in Release 12.2\(33\)SXH8a, page 143](#)
- [New Features in Release 12.2\(33\)SXH8, page 143](#)
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- [New Features in Release 12.2\(33\)SXH2, page 146](#)
- [New Features in Release 12.2\(33\)SXH1, page 147](#)
- [New Features in Release 12.2\(33\)SXH, page 148](#)
- [Software Features from Earlier Releases, page 163](#)

**Note**

- See the “[Supervisor Engine 32 \(CAT6000-SUP32/MSFC2A\)](#)” section on page 22 for the list of features not supported with Supervisor Engine 32.
- Cisco ME 6500 Series Ethernet switches (ME6524) are not supported in Release 12.2(33)SXJ and later releases. Support continues in Release 12.2(33)SXI and rebuilds.
- See the following site for information about MIBs:
<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>
- Features in the Cisco IOS 12.2SX releases that are also supported in the Cisco IOS 12.2 mainline, 12.2T and 12.2S releases are documented in the publications for those releases. When applicable, this section refers to those publications for platform-independent features supported in the Cisco IOS 12.2SX releases.
- Release 12.2(33)SXJ and later releases support NTPv4. Earlier releases support NTPv3. With NTPv3, be aware of [CSCec87418](#).

New Features in Release 12.2(33)SXJ6

These sections describe the new features in Release 12.2(33)SXJ6, 23 Jul 2013:

- [New Hardware Features in Release 12.2\(33\)SXJ6, page 118](#)
- [New Software Features in Release 12.2\(33\)SXJ6, page 118](#)

New Hardware Features in Release 12.2(33)SXJ6

None.

New Software Features in Release 12.2(33)SXJ6

- IP Access List Entry - Persistent Sequence Numbering Across Reloads—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_data_acl/configuration/12-2sx/sec-acl-seq-num-persistent.html

New Features in Release 12.2(33)SXJ5

These sections describe the new features in Release 12.2(33)SXJ5, 08 Feb 2013:

- [New Hardware Features in Release 12.2\(33\)SXJ5, page 118](#)
- [New Software Features in Release 12.2\(33\)SXJ5, page 119](#)

New Hardware Features in Release 12.2(33)SXJ5

None.

New Software Features in Release 12.2(33)SXJ5

None.

New Features in Release 12.2(33)SXJ4

These sections describe the new features in Release 12.2(33)SXJ4, 31 Aug 2012:

- [New Hardware Features in Release 12.2\(33\)SXJ4, page 119](#)
- [New Software Features in Release 12.2\(33\)SXJ4, page 119](#)

New Hardware Features in Release 12.2(33)SXJ4

None.

New Software Features in Release 12.2(33)SXJ4

Configurable System Controller Reset Threshold—With a redundant supervisor engine, if a TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, or TM_NPP_PARITY_ERROR error occurs, the affected supervisor engine reloads.

Without a redundant supervisor engine, if a TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, or TM_NPP_PARITY_ERROR error occurs, one of the following happens:

- If the system controller reset threshold has not been reached, reset the system controller ASIC.
- If the system controller reset threshold has been reached, reload the supervisor engine.

The default system controller reset threshold value is 1, configurable with the **platform system-controller reset-threshold** *threshold_value* command. The value range is 1 through 100.

TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, and TM_NPP_PARITY_ERROR errors cause system messages.

- Before the threshold is reached, the errors cause the following system messages:

```
%SYSTEM_CONTROLLER-<>-THRESHOLD
%SYSTEM_CONTROLLER-<>-ERROR
%SYSTEM_CONTROLLER-<>-MISTRAL_RESET
```

- After the threshold is reached, the errors cause the following system messages:

```
%SYSTEM_CONTROLLER-<>-ERROR
%SYSTEM_CONTROLLER-<>-FATAL
```

New Features in Release 12.2(33)SXJ3

These sections describe the new features in Release 12.2(33)SXJ3, 25 Apr 2012:

- [New Hardware Features in Release 12.2\(33\)SXJ3, page 120](#)
- [New Software Features in Release 12.2\(33\)SXJ3, page 120](#)

**Note**

IOS Server Load Balancing (SLB) is not supported in Release 12.2(33)SXJ and later releases. Support continues in Release 12.2(33)SXI and rebuilds. Release 12.2(33)SXJ and later releases support server load balancing (SLB) as implemented on the Application Control Engine (ACE) module (ACE20-MOD-K9). The IOS SLB CLI is not present in Release 12.2(33)SXJ3 and later releases.

New Hardware Features in Release 12.2(33)SXJ3

None.

New Software Features in Release 12.2(33)SXJ3

None.

New Features in Release 12.2(33)SXJ2

These sections describe the new features in Release 12.2(33)SXJ2, 19 Dec 2011:

- [New Hardware Features in Release 12.2\(33\)SXJ2, page 120](#)
- [New Software Features in Release 12.2\(33\)SXJ2, page 120](#)

**Note**

In Release 12.2(33)SXJ2 and later releases, syslog messages are generated if the clock source on packet-over-sonet interfaces changes because of an alarm on the link or if an S1 synchronization status message byte (SSB) is received. Clock source changes caused by command entry do not generate syslog messages. ([CSCtk10010](#))

New Hardware Features in Release 12.2(33)SXJ2

None.

New Software Features in Release 12.2(33)SXJ2

- PoE Plus (PoE+, PoEP) support—See this publication:
[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/power_over_ethernet.html#PoE_Plus_\(PoE+,_PoEP\)_support](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/power_over_ethernet.html#PoE_Plus_(PoE+,_PoEP)_support)
- Port Channel Load Deferral—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Configuring_Port_Load_Share_Deferral_on_the_Peer_Switch
- VPLS PIM and IGMP Snooping (WAN Interfaces)—See this publication:
[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooigmp.html#VPLS_PIM_and_IGMP_Snooping_\(WAN_Interfaces\)](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooigmp.html#VPLS_PIM_and_IGMP_Snooping_(WAN_Interfaces))
[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooppim.html#VPLS_PIM_and_IGMP_Snooping_\(WAN_Interfaces\)](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooppim.html#VPLS_PIM_and_IGMP_Snooping_(WAN_Interfaces))

- LLDP Inline Power Negotiation for PoE+—See this publication:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/power_over_ethernet.html#LLDP_Inline_Power_Negotiation_for_PoE+

New Features in Release 12.2(33)SXJ1

These sections describe the new features in Release 12.2(33)SXJ1, 30 Jun 2011:

- [New Hardware Features in Release 12.2\(33\)SXJ1, page 121](#)
- [New Software Features in Release 12.2\(33\)SXJ1, page 121](#)



Note

In Release 12.2(33)SXJ1 and later releases, CDP is disabled by default on ES+ line card and 7600-SIP-600 ports ([CSCtk12860](#)).

New Hardware Features in Release 12.2(33)SXJ1

- ASA Services Module for Catalyst 6500-E, 3DES/AES (WS-SVC-ASA-SM1-K9)



Note

Supported only with 6500 E-series chassis: WS-C6513-E, WS-C6509-V-E, WS-C6509-E, WS-C6506-E, WS-C6504-E, and WS-C6503-E. Not supported in PFC3A mode.

- Network Analysis Module 3 (WS-SVC-NAM3-6G-K9)



Note

Supported only with 6500 E-series chassis: WS-C6513-E, WS-C6509-V-E, WS-C6509-E, WS-C6506-E, WS-C6504-E, and WS-C6503-E. Not supported in PFC3A mode.

- Four-port Ethernet Services Plus Extended Transport (ES+XT) Line Cards (76-ES+XT-4TG3CXL, 76-ES+XT-4TG3C)
- Two-port Ethernet Services Plus Extended Transport (ES+XT) Line Cards (76-ES+XT-2TG3CXL, 76-ES+XT-2TG3C)
- Four-port Ethernet Services Plus (ES) Line Cards (7600-ES+4TG3CXL, 7600-ES+4TG3C)
- Two-port Ethernet Services Plus (ES) Line Card (7600-ES+2TG3CXL, 7600-ES+2TG3C)
- 10GBASE-LR 1310 nm SMF (SFP-10G-LR)
- 10GBASE-T X2 Module for CAT6A/CAT7 copper cable (X2-10GB-T)

New Software Features in Release 12.2(33)SXJ1

- 6500 ES+XT-4TG3C/3CXL support with VSS—The ES+ line cards are supported in VSS mode.
- Critical voice VLAN support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Critical_voice_VLAN_support
- IGMP snooping querier enhancements—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooigmp.html#IGMP_snooping_querier_enhancements

- IPsec Encryption in VSS System—VSS mode supports the WS-SSC-600 Services SPA Carrier (SSC) and WS-IPSEC-3 IPsec SPA.
- IPv6 Route Health Injection (IPv6 RHI) on ACE-30—Release 12.2(33)SXJ1 provides support on the switch for the IPv6 RHI feature implemented on the ACE30-MOD-K9.
- Routed Pseudo-Wire and Routed VPLS—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/l2vpn_advanced_vpls.html#Routed_Pseudo-Wire_and_Routed_VPLS
- VLAN translation support with A-VPLS—Release 12.2(33)SXJ1 testing verified support for L2VPN Advanced VPLS (A-VPLS) traffic through ES+ line ports and through LAN ports configured for VLAN translation.
- VRF aware source interface for syslog transactions—See this publication:
http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6_09.html#logging_source-interface
http://www.cisco.com/en/US/docs/ios/netmgmt/command/reference/nm_09.html#logging_source-interface
- VRF-lite aware NAT for non-overlapping IP addresses:

**Note**

NAT VRF-lite is supported **only** with nonoverlapping IP addresses.

The following is an example of the supported configuration:

```
ip nat outside source static real_ip_address nat_ip_address

interface vlan vlan_ID_X
  ip nat inside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value

interface vlan vlan_ID_Y
  ip nat outside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value
! Configuration of up to 248 interfaces supported.
!
ip nat inside source static local_ip1 global_ip1 vrf vrf_name
ip nat inside source static local_ip2 global_ip2 vrf vrf_name
!
! Up to 124 of these statements
```

**Note**

-
- This feature is not supported if there are overlapping IP address ranges among the VRF-lite domains. Support for this feature is limited to VRF-lite configurations with non-overlapping IP addresses.
 - This feature has limited support based on the provided sample configuration.
-

New Features in Release 12.2(33)SXJ

These sections describe the new features in Release 12.2(33)SXJ, 21 Mar 2011:

- [New Hardware Features in Release 12.2\(33\)SXJ, page 123](#)
- [New Software Features in Release 12.2\(33\)SXJ, page 123](#)



Note

- Cisco ME 6500 Series Ethernet switches (ME6524) are not supported in Release 12.2(33)SXJ and later releases. Support continues in Release 12.2(33)SXI and rebuilds.
- IOS Server Load Balancing (SLB) is not supported in Release 12.2(33)SXJ and later releases. Support continues in Release 12.2(33)SXI and rebuilds. Release 12.2(33)SXJ and later releases support server load balancing (SLB) as implemented on the Application Control Engine (ACE) module (ACE20-MOD-K9).

New Hardware Features in Release 12.2(33)SXJ

- Wireless Services Module 2 (WiSM2) (WS-SVC-WISM2-K9)—See the [“Wireless Services Module 2 \(WiSM2\)” section on page 99](#).
- 5-port Gigabit Ethernet SPA, SFP Optics, version 2 (SPA-5X1GE-V2)—See this publication: http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76intsw.html#SIP,_SSC,_and_SPA_Compatibility



Note

Release 12.2(33)SXJ and later releases do not support these modules:

- Content Switching Module (CSM; WS-X6066-SLB-APC)
- Content Switching Module with SSL (CSM-S; WS-X6066-SLB-S-K9)
- Secure Sockets Layer (SSL) Services Module (WS-SVC-SSL-1)

New Software Features in Release 12.2(33)SXJ



Note

Release 12.2(33)SXJ and later releases do not support Cisco IOS Software Modularity. With redundant supervisor engines, eFSU upgrade from a Cisco IOS Software Modularity image to a Release 12.2(33)SXJ image might result in a significant delay before the switch becomes active; the switch will be in the RPR redundancy mode.

- eFSU (Enhanced Fast Software Upgrade) support from 12.2(33)SXI to 12.2(33)SXJ—See this publication: http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/issu_efs.html#SXI_SXJ
- EnergyWise Pre Phase 2.5—See this publication: <http://www.cisco.com/en/US/docs/switches/lan/energywise/phase2/ios/release/notes/OL19810.html>

- mLACP for Server Access—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/mlacp_server_support.html
- Multi-auth Vlan Assignment—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Multi-auth_Vlan_Assignment
- NEAT (Network Edge Authentication Topology)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#NEAT_CISP
- NHRP Reformation move to IP Services—Release 12.2(33)SXJ and later releases support the next hop resolution protocol (NHRP) in the IP Services image.
- NTPv4 with support for IPv4 and IPv6—See this publication:
<http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-ntp4.html>

**Note**

Release 12.2(33)SXJ and later releases support NTPv4. Earlier releases support NTPv3. With NTPv3, be aware of [CSCec87418](#).

- NSF / SSO - Any Transport over MPLS (AToM)—See this publication:
http://www.cisco.com/en/US/docs/ios/mppls/configuration/guide/mp_trnsprt_mpls_atom.html
- Storm Control action -- Port disable—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/storm.html#Storm_Control_action_-_Port_disable
- Tacacs over IPv6—See this publication:
http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-adsl_dial.html
- TrustSec VRF Aware—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/trustsec/configuration/guide/sxp_config.html

New Features in Release 12.2(33)SX12

These sections describe the new features in Release 12.2(33)SX12, 13 Sep 2013:

- [New Hardware Features in Release 12.2\(33\)SX12, page 124](#)
- [New Software Features in Release 12.2\(33\)SX12, page 124](#)

New Hardware Features in Release 12.2(33)SX12

None.

New Software Features in Release 12.2(33)SX12

None.

New Features in Release 12.2(33)SXI11

These sections describe the new features in Release 12.2(33)SXI11, 25 Feb 2013:

- [New Hardware Features in Release 12.2\(33\)SXI11, page 125](#)
- [New Software Features in Release 12.2\(33\)SXI11, page 125](#)

New Hardware Features in Release 12.2(33)SXI11

None.

New Software Features in Release 12.2(33)SXI11

None.

New Features in Release 12.2(33)SXI10

These sections describe the new features in Release 12.2(33)SXI10, 18 Sep 2012:

- [New Hardware Features in Release 12.2\(33\)SXI10, page 125](#)
- [New Software Features in Release 12.2\(33\)SXI10, page 125](#)

New Hardware Features in Release 12.2(33)SXI10

None.

New Software Features in Release 12.2(33)SXI10

Configurable System Controller Reset Threshold—With a redundant supervisor engine, if a TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, or TM_NPP_PARITY_ERROR error occurs, the affected supervisor engine reloads.

Without a redundant supervisor engine, if a TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, or TM_NPP_PARITY_ERROR error occurs, one of the following happens:

- If the system controller reset threshold has not been reached, reset the system controller ASIC.
- If the system controller reset threshold has been reached, reload the supervisor engine.

The default system controller reset threshold value is 1, configurable with the **platform system-controller reset-threshold** *threshold_value* command. The value range is 1 through 100.

TM_DATA_PARITY_ERROR, TM_LINK_ERR_INBAND, and TM_NPP_PARITY_ERROR errors cause system messages.

- Before the threshold is reached, the errors cause the following system messages:

```
%SYSTEM_CONTROLLER-<>-THRESHOLD
%SYSTEM_CONTROLLER-<>-ERROR
%SYSTEM_CONTROLLER-<>-MISTRAL_RESET
```

- After the threshold is reached, the errors cause the following system messages:

```
%SYSTEM_CONTROLLER-<>-ERROR
%SYSTEM_CONTROLLER-<>-FATAL
```

New Features in Release 12.2(33)SXI9

These sections describe the new features in Release 12.2(33)SXI9, 02 Mar 2012:

- [New Hardware Features in Release 12.2\(33\)SXI9, page 126](#)
- [New Software Features in Release 12.2\(33\)SXI9, page 126](#)

New Hardware Features in Release 12.2(33)SXI9

None.

New Software Features in Release 12.2(33)SXI9

None.

New Features in Release 12.2(33)SXI8a

These sections describe the new features in Release 12.2(33)SXI8a, 07 Dec 2011:

- [New Hardware Features in Release 12.2\(33\)SXI8a, page 126](#)
- [New Software Features in Release 12.2\(33\)SXI8a, page 126](#)

New Hardware Features in Release 12.2(33)SXI8a

None.

New Software Features in Release 12.2(33)SXI8a

None.

New Features in Release 12.2(33)SXI8

These sections describe the new features in Release 12.2(33)SXI8, 03 Nov 2011:

- [New Hardware Features in Release 12.2\(33\)SXI8, page 126](#)
- [New Software Features in Release 12.2\(33\)SXI8, page 126](#)

New Hardware Features in Release 12.2(33)SXI8

None.

New Software Features in Release 12.2(33)SXI8

- Port Channel Load Deferral—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Configuring_Port_Load_Share_Deferral_on_the_Peer_Switch

New Features in Release 12.2(33)SXI7

These sections describe the new features in Release 12.2(33)SXI7, 26 Jul 2011:

- [New Hardware Features in Release 12.2\(33\)SXI7, page 127](#)
- [New Software Features in Release 12.2\(33\)SXI7, page 127](#)

New Hardware Features in Release 12.2(33)SXI7

None.

New Software Features in Release 12.2(33)SXI7

- Enhanced IPv6 Neighbor Discovery Cache Management—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ipv6-addrg-bsc-con.html>

New Features in Release 12.2(33)SXI6

These sections describe the new features in Release 12.2(33)SXI6, 31 Mar 2011:

- [New Hardware Features in Release 12.2\(33\)SXI6, page 127](#)
- [New Software Features in Release 12.2\(33\)SXI6, page 127](#)

New Hardware Features in Release 12.2(33)SXI6

None.

New Software Features in Release 12.2(33)SXI6

- VRF-lite aware NAT for non-overlapping IP addresses:



Note

NAT VRF-lite is supported **only** with nonoverlapping IP addresses.

The following is an example of the supported configuration:

```
ip nat outside source static real_ip_address nat_ip_address

interface vlan vlan_ID_X
  ip nat inside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value

interface vlan vlan_ID_Y
  ip nat outside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value
! Configuration of up to 248 interfaces supported.
!
ip nat inside source static local_ip1 global_ip1 vrf vrf_name
ip nat inside source static local_ip2 global_ip2 vrf vrf_name
```

!

! Up to 124 of these statements

**Note**

- This feature is not supported if there are overlapping IP address ranges among the VRF-lite domains. Support for this feature is limited to VRF-lite configurations with non-overlapping IP addresses.
- This feature has limited support based on the provided sample configuration.

New Features in Release 12.2(33)SX15

These sections describe the new features in Release 12.2(33)SX15, 29 Oct 2010:

- [New Hardware Features in Release 12.2\(33\)SX15, page 128](#)
- [New Software Features in Release 12.2\(33\)SX15, page 128](#)

New Hardware Features in Release 12.2(33)SX15

None.

New Software Features in Release 12.2(33)SX15

- NAT - Routemaps Outside-to-Inside support (supported only on ME 6500 switches)—See this document:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipaddr_nat/configuration/12-2sx/iadnat-addr-consv.html

New Features in Release 12.2(33)SX14a

These sections describe the new features in Release 12.2(33)SX14a, 22 Jul 2010:

- [New Hardware Features in Release 12.2\(33\)SX14a, page 128](#)
- [New Software Features in Release 12.2\(33\)SX14a, page 128](#)

New Hardware Features in Release 12.2(33)SX14a

None.

New Software Features in Release 12.2(33)SX14a

None.

New Features in Release 12.2(33)SX14

These sections describe the new features in Release 12.2(33)SX14, 09 Jun 2010:

- [New Hardware Features in Release 12.2\(33\)SX14, page 129](#)
- [New Software Features in Release 12.2\(33\)SX14, page 129](#)

**Note**

CSCth76325 prevents support of OSPFv2 in IOS IP Base images in Release 12.2(33)SX14. Release 12.2(33)SX14 Software Modularity IP Base images support OSPFv2.

New Hardware Features in Release 12.2(33)SX14

- 16-Port 10 Gigabit Ethernet Copper Module (WS-X6716-10T-3C, WS-X6716-10T-3CXL)
- 48-port 10/100/1000 Mbps (WS-X6148E-GE-45AT)
- 7600-SIP-400 support in VSS mode
- Application Control Engine (ACE) module (ACE30-MOD-K9)
- Secure Sockets Layer (SSL) Services Module (WS-SVC-SSL-1)
- 10GBASE-LRM 1310 nm MMF and SMF (SFP-10G-LRM)

New Software Features in Release 12.2(33)SX14

- Auto Interleaved Port priority for LACP—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/channel.html>
- DHCP - Server Port Based Address Allocation—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipaddr_dhcp/configuration/12-2sx/dhcp-prt-bsd-aa.html
- Energywise Phase - 2—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/energywise/phase2/ios/configuration/guide/ew_v2.html
- Fast UDLD—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/udld.html>
- HSRP: Global IPv6 Address—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-fhrp.html>
- IEEE 802.1x - RADIUS Change of Authorization (CoA)—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/sec_cfg_authentifcn.html
- IPv6 PACL support—See this publication:
http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-first_hop_security.html
- IPv6 Policy-Based Routing—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/15-2s/ip6-pol-bsd-rtnng.html>
- IPv6 RA-Guard Host Mode—See this publication:
http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-first_hop_security.html
- L2VPN Advanced VPLS (A-VPLS)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/l2vpn_advanced_vpls.html
- Mac Move and Replace—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Understanding_MAC_Move

- MPLS - Egress Netflow—See this publication:
http://www.cisco.com/en/US/docs/ios/netflow/configuration/guide/cfg_nf_egress_acctg.html
- Multicast Service Reflection—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_serv_reflect.html
- Netflow Data Export to a collector in a VRF—See this publication:
http://www.cisco.com/en/US/docs/ios/netflow/command/reference/nf_01.html#ip_flow-export_destination
- NSF/SSO - Virtual Private LAN Services (supported only on 7600-SIP-400 ports)—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpls_atom.html
- OSPF for Routed Access—OSPF for Routed Access OSPF for routed access is designed specifically to enable customers to extend Layer 3 routing capabilities to the access or Wiring Closet. OSPF for routed access supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes. With the typical topology (hub and spoke) in a campus environment, where the wiring closets (spokes) are connected to the distribution switch (hub) forwarding all nonlocal traffic to the distribution layer, the wiring closet switch need not hold a complete routing table. In your best practice design, the distribution switch sends a default route to the wiring closet switch to reach inter-area and external routes (OSPF stub or totally stub area configuration). Refer to the following link for more details:
<http://www.cisco.com/en/US/docs/solutions/Enterprise/Campus/routed-ex.html>

The IP Base image supports OSPF for routed access. The IP Services image is required if you need multiple OSPFv2 and OSPFv3 instances without route restrictions. Additionally, IP Services is required to enable the VRF-lite feature.



Note [CSCth76325](#) prevents support of OSPFv2 in IOS IP Base images in Release 12.2(33)SX14. Release 12.2(33)SX14 Software Modularity IP Base images support OSPFv2.

- Service Advertisement Framework (SAF)—See this publication:
http://www.cisco.com/en/US/docs/ios/saf/configuration/guide/saf_cg.html
- SIP 400 Support on VSS—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html>
- TrustSec IPv6 SGT Learning from Data-Path—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/trustsec/configuration/guide/trustsec.html>
- TrustSec SXP SNMP and Syslogs—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/trustsec/configuration/guide/trustsec.html>
- VPLS MAC Address Withdrawal—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_hvpls_npe_red.html
- VSS Quad-Sup Uplink Forwarding—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html>
- VSS VSL Multicast Fast Redirect—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html>

New Features in Release 12.2(33)SX13

These sections describe the new features in Release 12.2(33)SX13, 04 Nov 2009:

- [New Hardware Features in Release 12.2\(33\)SX13, page 131](#)
- [New Software Features in Release 12.2\(33\)SX13, page 131](#)

New Hardware Features in Release 12.2(33)SX13

None.

New Software Features in Release 12.2(33)SX13

- Deprecation of install mode and patching with Cisco IOS Software Modularity—See this publication:
http://www.cisco.com/en/US/docs/ios/swmod/configuration/guide/sw_mod_instl_cfg.html
- LACP Port-Channel Standalone Disable—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-o1.html#GUID-7D465C5C-2593-4210-8F99-F06E889F1019>

New Features in Release 12.2(33)SX12a

These sections describe the new features in Release 12.2(33)SX12a, 03 Sep 2009:

- [New Hardware Features in Release 12.2\(33\)SX12a, page 131](#)
- [New Software Features in Release 12.2\(33\)SX12a, page 131](#)

New Hardware Features in Release 12.2(33)SX12a

None.

New Software Features in Release 12.2(33)SX12a

None.

New Features in Release 12.2(33)SX12

These sections describe the new features in Release 12.2(33)SX12, 17 Jul 2009:

- [New Hardware Features in Release 12.2\(33\)SX12, page 132](#)
- [New Software Features in Release 12.2\(33\)SX12, page 132](#)

New Hardware Features in Release 12.2(33)SX12

- Content Switching Module (CSM)—See these websites:
http://www.cisco.com/en/US/products/hw/modules/ps2706/ps780/tsd_products_support_model_home.html
<http://www.cisco.com/en/US/products/hw/modules/ps2706/ps780/index.html>
- Content Switching Module with SSL (CSM-S)—See these websites:
http://www.cisco.com/en/US/products/ps6077/tsd_products_support_model_home.html
<http://www.cisco.com/en/US/products/ps6077/index.html>
- OneX 10G X2 to SFP+ Converter (CVR-X2-SFP10G)
- 1-Port 10 Gigabit Ethernet SPA (SPA-1X10GE-L-V2)—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76intsw.html#SIP,_SSC,_and_SPA_Compatibility

New Software Features in Release 12.2(33)SX12

- 802.1ag - IEEE D8.1 standard Compliant CFM, Y.1731 multicast LBM / AIS / RDI / LCK, IP SLA for Ethernet—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/cether/configuration/12-2sy/ce-cfm-ieee-y1731.html>
- Automated Notification and Detection of LTL/FPOE Problem—The Local Target Logic and Fabric Port Of Exit Static Random Access Memory in various constellation based cards are not protected via Empty Catch Clause. A software based parity table is now maintained and updated in firmware to detect and recover from Static Random Access Memory errors on LAN and Komodo+ cards.
- Filter-ID Based ACL Application—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Filter-ID_ACLS
- Local forwarding on Standby Supervisor Uplinks—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-f1.html#GUID-A815D749-F21A-4624-9DCB-81390BBE369E>
- SSO - BFD—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bfd/configuration/guide/irb_bfd.html
- SSO - Etherchannel Traffic Convergence Improvement—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/nsfssso.html#Redundancy_Configuration_Guidelines_and_Restrictions
- Subinterface Crypto connect vlan support for E-Flexwan/FE PA—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76ovwvpn.html#Interoperability
- VSS - MPLS/IPv6 Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Software_Features

New Features in Release 12.2(33)SXI1

These sections describe the new features in Release 12.2(33)SXI1, 31 Mar 2009:

- [New Hardware Features in Release 12.2\(33\)SXI1, page 133](#)
- [New Software Features in Release 12.2\(33\)SXI1, page 133](#)

New Hardware Features in Release 12.2(33)SXI1

None.

New Software Features in Release 12.2(33)SXI1



Note

See the following site for information about supported MIBs:

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

- 6PE Multipath—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mptcl-bgp.html>
- 802.1x with user distribution—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_Multiple_VLANs_and_VLAN_User_Distribution_with_VLAN_Assignment
- BGP Support for 4-byte ASN—See these publications:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_basic_net.html
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_overview.html
- CISCO-IP-IF-MIB Support for IP Helper addresses—See this publication:
http://www.cisco.com/en/US/docs/ios/interface/configuration/guide/ir_iptunnelmibs.html
- Modular IOS Usability - ION Installer Usability Enhancements—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/swmod/configuration/12-2sx/sm-12-2sx-book.html>
- Trusted boundary with Cisco device verification—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/qos.html#Configuring_Trusted_Boundary_Device_Verification
- VSS Support on IP Base Image—See the “Feature Set Descriptions” section on page 115.

New Features in Release 12.2(33)SXI

These sections describe the new features in Release 12.2(33)SXI, 11 Nov 2008:

- [New Hardware Features in Release 12.2\(33\)SXI, page 134](#)
- [New Software Features in Release 12.2\(33\)SXI, page 135](#)

**Note**

- Release 12.2(33)SXJ and later releases support NTPv4. Earlier releases support NTPv3. With NTPv3, be aware of [CSCec87418](#).
- These commands, which are present in the Release 12.2(33)SXI CLI, will be tested and supported in a future release:
 - **add prepend** option to **install bind** command
 - **add reload** option to **install activate** command
 - **add pending** option to **show install running** command
 - **mls qos trust device cisco-phone** ([CSCsv53392](#))
- [NAC Layer 3 IP validation](#), called “NAC - Network Admission Control” in Feature Navigator, is supported only in Release 12.2(33)SXH and rebuilds. Release 12.2(33)SXI and later releases do not support NAC Layer 3 IP validation.
- With Release 12.2(33)SXI and later releases where [CSCso97991](#) is not resolved, you must configure an appropriate [burst size](#) when you configure QoS policing on WAN ports. Do not rely on the burst size calculated by QoS.
- Release 12.2(33)SXI and later releases support additional logical interfaces (see the “[Spanning Tree Troubleshooting](#)” section on page 9).

New Hardware Features in Release 12.2(33)SXI

- 10GBASE DWDM X2 Modules—See this publication:
http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6576/data_sheet_c78_489725.html
- 10GBASE-ZR X2 Module for SMF (X2-10GB-ZR)—See this publication:
http://www.cisco.com/en/US/prod/collateral/modules/ps5455/ps6574/product_data_sheet0900aecd801f92aa_ps5251_Products_Data_Sheet.html
- 2-Port Gigabit Ethernet Shared Port Adapter (SPA-2X1GE-V2)
- ATM SPAs:
 - 1-Port OC-12c/STM-4c ATM SPA (SPA-1XOC12-ATM)
 - 1 port OC-48c/STM-16 ATM SPA (SPA-1XOC48-ATM)
 - 2-Port OC-3c/STM-1c ATM SPA (SPA-2XOC3-ATM, SPA-4XOC3-ATM)
 - 2-Port OC-48 POS/RPR SPA (2xOC48 POS/RPR SPA)
 - See these publications:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/760vpos.html
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/install_upgrade/6500series/6500sov.html

- Services SPA Carrier-600 (WS-SSC-600) and VPN Services Port Adapter (WS-IPSEC-3)—See these publications:

http://www.cisco.com/en/US/docs/interfaces_modules/services_modules/vspa/configuration/guide/ivm_sw_book.html

http://www.cisco.com/en/US/docs/interfaces_modules/services_modules/vspa/hardware/ivmhw_book.html

New Software Features in Release 12.2(33)SX1



Note

See the following site for information about supported MIBs:

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

- Asymmetric Carrier Delay—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Asymmetric_Carrier_Delay
- AToM over GRE - Phase 2—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfgeth.html#Configuring_AToM_over_GRE
- Backplane Traffic Monitor—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/plat_mon.html
- Bandwidth-Based Call Admission Control (CAC) for IP Multicast—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_admission_control.html
- BGP Route-Map Continue Support for Outbound Policy—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_external_sp.html
- Callhome Request—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/callhome.html#Sending_a_Request_for_an_Analysis_and_Report
- CatOS Parity: Port VLAN Granularity for Show Commands—See these publications:
<http://www.cisco.com/en/US/docs/ios-xml/ios/cether/command/ce-s1.html#GUID-E84B167B-7119-4921-8A62-3664F5F3F144>
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-C5A646B9-2364-4412-93EF-AF21D42470BD>
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-9B5E979A-69F9-41B5-9EDC-26717977DC03>
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-2EE37145-597D-40E1-9E5F-EA466D7CD656>
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-499A9431-66B6-4001-AD4F-BD02B04731E3>
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-96B5F041-14B6-44A3-9624-F1569F4B1E91>

<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s5.html#GUID-5932AC84-8527-4F41-8FE1-4EC1D7B61806>

http://www.cisco.com/en/US/docs/ios/netmgmt/command/reference/nm_10.html#show_cdp

- CDP Enhancement - Host presence TLV—See these publications:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#802.1X_Host_Modes

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/voip.html#Cisco_IP_Phone_Data_Traffic

- CFM-2—See this publication:

http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_cfm.html

http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_metro_ethernet.html

- CNS—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- CNS - Configuration Agent—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- CNS - Event Agent—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- CNS - Image Agent—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- CNS - Interactive CLI—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- Command Scheduler (Kron)—See this publication:

http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_services.html

- Config Change Tracking Identifier— The Config Change Tracking Identifier feature assigns a version number to each saved version of the Cisco IOS running-config file and displays details about the versions. When the version number is updated a notification is generated. The Config Logger can also use this feature to determine if there have been any changes to the Cisco IOS running-config file. To enable the Config Change Tracking Identifier feature, enter the **show config id command**.

- Configuration Rollback Confirmed Change—See this publication:

http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-rollback.html

- DHCP - DHCPv6 Relay Agent notification for Prefix Delegation—See this publication:

<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-dhcp.html>

- DHCPv6 - Relay - Reload persistent Interface ID option—See this publication:

<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-dhcp.html>

- DHCPv6 Ethernet Remote ID option—See this publication:

<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-dhcp.html>

- Display Admin speed/duplex negotiation status—See this publication:

http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/intrface.html#Displaying_the_Speed_and_Duplex_Mode_Configuration

- Dual PQ (Priority Queue)—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfigsip.html#Configuring_Dual_Priority_Queueing_on_a_Cisco_7600_SIP-400
- eFSU (Enhanced Fast Software Upgrade)—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/issu_efsuh.html
- Embedded Event Manager (EEM) 2.4—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_eem_overview.html
- Embedded Syslog Manager (ESM)—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_esm_syslog.html
- Ethernet Local Management Interface (LMI) at Provider Edge (PE)—See these publications:
http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_elmi-pe.html
http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/htethlmi.html
- Ethernet OAM-phase2/ELMI-PE—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfigeth.html#Configuring_Ethernet_Operations,_Administration,_and_Maintenance
- FHRP - EOT integration with EEM—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-4t/iap-eot.html>
- FHRP - GLBP Client Cache—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-glbp.html
- FHRP - GLBP Support for IPv6—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-fhrp.html>
- FHRP - HSRP Group Shutdown—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-hsrp.html
- FHRP - HSRP Multiple Group Optimization—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-hsrp.html
- Flash MIB enhancements—The Flash MIB Enhancements feature allows sorting of flash files according to device, partition, and file indexes. Beginning with Cisco IOS Release 12.2(33)SXI, the Flash MIB Enhancements feature adds the user functionality to sort flash files based on file type. The feature also introduces the **snmp mib flash cache interval** command to set the frequency of the data collection process that enables sorting of data stored in ciscoFlashFileTable. The command also enables the cache for ciscoFlashFileTable to speed up access to data. For more information about setting the data collection interval, see the **snmp mib flash cache interval** command in the Cisco IOS Network Management Command Reference at the following URL:
http://www.cisco.com/en/US/docs/ios/netmgmt/command/reference/nm_book.html
To locate and download the Cisco Flash MIB for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:
<http://tools.cisco.com/ITDIT/MIBS/servlet/index>
- HSRP for IPv6—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-fhrp.html>

- HSRP Gratuitous ARP—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhrp-hsrp.html
- IEEE 802.1ak - MVRP and MRP—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/IEEE802_1ak_MVRP_MRP.html
- IEEE 802.1X - Flexible Authentication—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/dot1x_flex_auth.html
- IEEE 802.1X - Multiple Authentication—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Multiauthentication_Mode
- IEEE 802.1X - Open Authentication—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Pre-Authentication_Open_Access
- IEEE 802.1X - User Port Description—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Port_Descriptors
- IEEE 802.1X Agentless Audit Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#NAC_Agentless_Audit_Support
- IEEE 802.1x Fallback support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Understanding_the_Port-based_Authentication_Process
- IEEE 802.1X Multi-Domain Authentication—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Multidomain_Authentication_Mode
- IEEE 802.1x with ACL Assignments—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_ACL_Assignments_and_Redirect_URLs
- IEEE 802.3ah - Link Fault RFI Support—See this publication:
http://www.cisco.com/en/US/docs/ios/ce/ether/configuration/guide/ce_oam.html
- Intrusion Detection Service Module (IDSM) support in VSS mode—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Service_Module_Support
- IP SLAs for Metro-Ethernet—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_metro_ethernet.html
- IP SLAs Random Scheduler—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_multi_scheduler.html
- IPv6 Access Services: DHCPv6 Relay Agent—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-dhcp.html>

- IPv6 ACL Extensions for Mobile IPv6—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mobile.html>
- IPv6 Reformation—IPv6 features are supported in ipbase(k9) and ipservices(k9) images.
- IPv6 Routing - EIGRP Support—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-eigrp.html>
- IPv6 support for VSPA, VPN Services Port Adapter (WS-IPSEC-3)—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/services_modules/vspa/configuration/guide/ivm_vpn3.html
- IPv6 VPN over MPLS (6VPE)—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-ov-mpls-6vpe.html>
- IPv6: Multicast Address Group Range Support—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
- L2VPN Pseudowire Redundancy—See this publication:
http://www.cisco.com/en/US/docs/ios/wan/configuration/guide/wan_l2vpn_pw_red.html
- LowSpeed SPA support on SIP400—See these publications:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76ovwser.html#Release_History
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/install_upgrade/6500series/6500sov.html
- MAC Move Counters—See this publication:
http://www.cisco.com/en/US/docs/ios/lanswitch/command/reference/lsw_m1.html#mac-address-table_notification_mac-move
- Mini Protocol Analyzer—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/mpa.html>
- MPLS EM - LSP Ping/Trace for LDP & RSVP IPv4 FECs—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_ldp_te_lsp_vccv.html
- MPLS EM - MPLS Multipath (ECMP) LSP Tree Trace—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_em_multipath_tree.html
- MPLS VPN - VRF CLI for IPv4 & IPv6 VPNs—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_ipv4_ipv6.html
- MPLS VPN 6VPE support over IP tunnels—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-ov-mpls-6vpe.html>
- MPLS VPN VRF Selection using Policy Based Routing—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_vrf_select_rt.html
- MSTP PVST Simulation disabling and Peer Inconsistency Check—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/stp_enhancement.html#Configuring_PVST_Simulation
- Multicast Address Group Range Support—The Multicast Address Group Range Support feature enhances multicast access control by introducing the capability to define a global range of multicast groups and channels to be permitted or denied using the **ip multicast group-range** command.

- Multicast Enhancement - Egress Replication Performance Improvement for Vlan & PortChannel—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/mcastv4.html#wpMulticast_Enhancement
- Multicast Replication Packet Drop Counter—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s5.html#GUID-51E19324-B9D7-4090-B49B-5003684D339F>
- Netconf access for Configuration over BEEP—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_netconf.html
- NETCONF over SSHv2—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cns_netconf.html
- Netflow Accounting for Unicast and Multicast on GRE tunnel interface—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/netflow/configuration/12-2sx/cfg-nf-gre-tun.html>
- PBF (Policy-Based Forwarding)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vacl.html#MAC_Policy-Based_Forwarding
- Per Interface Mroute State Limit—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_admission_control.html
- Per IP Session QoS support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/qos.html#Session-Based_PFC_QoS
- Pre-encryption QOS for VSPA—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/services_modules/vspa/configuration/guide/ivm_vpn3.html
- QoS Statistics Enhancement—See this publication:
http://www.cisco.com/en/US/docs/ios/qos/command/reference/qos_s4.html#show_mls_qos
- Radius Per-VRF Server Group—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_per_vrf_aaa.html
- Rapid-PVST+ Dispute Mechanism—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/spantree.html#Rapid-PVST>
- Reliable Delivery and Filtering for Syslog—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_reliable_del_filter.html
- Role-Based Access Control CLI commands—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_role_base_cli.html
- Show Command for Interface Trap Status—Beginning with Cisco IOS Release 12.2(33)SXI, the Show Command for Interface Trap Status feature adds the **show snmp mib ifmib traps** command to display the status of linkUp and linkDown traps. For more information about viewing linkUp and linkDown trap status, see the **show snmp mib ifmib traps** command in the Cisco IOS Network Management Command Reference at the following URL:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html

For more information about enabling SNMP notification types, see the Cisco IOS Network Management Configuration Guide at the following URL:

<http://www.cisco.com/en/US/docs/ios-xml/ios/snmp/configuration/12-2sx/snmp-12-2sx-book.html>

- Show Diagnostic Health—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/diags.html>
- SNMP over IPv6—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mng-apps.html>
- SNMPv3 - 3DES and AES Encryption Support—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_encrypt_snmp_sup.html
- SSO - IPv4 Multicast HA Support for Group-to-RP Mapping—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_ha_grp_to_rp_mappings.html
- SSO - VRRP—See these publications:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-vrrp.html
- Standalone MAB support—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/standalone_mab.html
- Static Virtual Tunnel & GRE/TP interface enhancements—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfvpna.html#Configuring_an_IPSec_Virtual_Tunnel_Interface
- STP Bridge Assurance—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/stp_enha.html#Understanding_Bridge_Assurance
- Sub Millisecond Policer Burst Size Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/qos.html#wppolicer_granularity
- Syslog over IPV6—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mng-apps.html>
- System Logging - EAL4 Certification Enhancements:



Note Official EAL4 certification is not claimed by Cisco Systems, Inc. This feature is part of current and planned enhancements which may qualify Cisco IOS Software for future certification.

This feature includes the following enhancements:

- The system logging process will now generate ‘audit start’ and ‘audit stop’ messages.
- The system logging process will now generate messages that include the date and time of an event, the type of event, the subject identity, and the outcome (success or failure) of an event.
- Changes to logging parameters will be logged.
- Further enhancements to minimize lost audit records.
- TACACS+ Per VRF—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_vrf_tacas_svrs.html

- VSS - 512 Etherchannels Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Configuring_Multichassis_EtherChannels
- VSS - ACE 10/20 Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Service_Module_Support
- VSS - Dual-active detection using L2 Fast Hello detection—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Dual-Active_Detection_Using_Dual-Active_Fast_Hello_Packets
- VSS - Firewall Service Module (FWSM) support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Service_Module_Support
- VSS - PACL support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Software_Features
- VSS - Wireless (WiSM) Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vss.html#Service_Module_Support
- VTP v3—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vtp.html>
- Web Authentication with Critical Auth support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/webauth.html#AAA_Fail_Policy
- Webauth Enhancements—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/webauth.html#Customization_of_the_Authentication_Proxy_Web_Pages

New Features in Release 12.2(33)SXH8b

These sections describe the new features in Release 12.2(33)SXH8b, 23 Sep 2011:

- [New Hardware Features in Release 12.2\(33\)SXH8b, page 142](#)
- [New Software Features in Release 12.2\(33\)SXH8b, page 142](#)

New Hardware Features in Release 12.2(33)SXH8b

None.

New Software Features in Release 12.2(33)SXH8b

None.

New Features in Release 12.2(33)SXH8a

These sections describe the new features in Release 12.2(33)SXH8a, 23 Mar 2011:

- [New Hardware Features in Release 12.2\(33\)SXH8a, page 143](#)
- [New Software Features in Release 12.2\(33\)SXH8a, page 143](#)

New Hardware Features in Release 12.2(33)SXH8a

None.

New Software Features in Release 12.2(33)SXH8a

None.

New Features in Release 12.2(33)SXH8

These sections describe the new features in Release 12.2(33)SXH8, 05 Oct 2010:

- [New Hardware Features in Release 12.2\(33\)SXH8, page 143](#)
- [New Software Features in Release 12.2\(33\)SXH8, page 143](#)

New Hardware Features in Release 12.2(33)SXH8

None.

New Software Features in Release 12.2(33)SXH8

None.

New Features in Release 12.2(33)SXH7

These sections describe the new features in Release 12.2(33)SXH7, 15 Mar 2010:

- [New Hardware Features in Release 12.2\(33\)SXH7, page 143](#)
- [New Software Features in Release 12.2\(33\)SXH7, page 143](#)

New Hardware Features in Release 12.2(33)SXH7

None.

New Software Features in Release 12.2(33)SXH7

- VRF-lite aware NAT for non-overlapping IP addresses:



Note

NAT VRF-lite is supported **only** with nonoverlapping IP addresses.

The following is an example of the supported configuration:

```
ip nat outside source static real_ip_address nat_ip_address

interface vlan vlan_ID_X
  ip nat inside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value

interface vlan vlan_ID_Y
  ip nat outside
  ip vrf forwarding vrf_name
  ip address vrf_ip_add mask_value
! Configuration of up to 248 interfaces supported.
!
ip nat inside source static local_ip1 global_ip1 vrf vrf_name
ip nat inside source static local_ip2 global_ip2 vrf vrf_name
!
! Up to 124 of these statements
```


Note

- This feature is not supported if there are overlapping IP address ranges among the VRF-lite domains. Support for this feature is limited to VRF-lite configurations with non-overlapping IP addresses.
- This feature has limited support based on the provided sample configuration.

New Features in Release 12.2(33)SXH6

These sections describe the new features in Release 12.2(33)SXH6, 21 Oct 2009:

- [New Hardware Features in Release 12.2\(33\)SXH6, page 144](#)
- [New Software Features in Release 12.2\(33\)SXH6, page 144](#)

New Hardware Features in Release 12.2(33)SXH6

None.

New Software Features in Release 12.2(33)SXH6

- Subinterface Crypto connect vlan support for E-Flexwan/FE PA—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/760vwpn.html#Interoperability

New Features in Release 12.2(33)SXH5

These sections describe the new features in Release 12.2(33)SXH5, 20 Apr 2009:

- [New Hardware Features in Release 12.2\(33\)SXH5, page 145](#)
- [New Software Features in Release 12.2\(33\)SXH5, page 145](#)

New Hardware Features in Release 12.2(33)SXH5

None.

New Software Features in Release 12.2(33)SXH5

None.

New Features in Release 12.2(33)SXH4

These sections describe the new features in Release 12.2(33)SXH4, 11 Nov 2008:

- [New Hardware Features in Release 12.2\(33\)SXH4, page 145](#)
- [New Software Features in Release 12.2\(33\)SXH4, page 145](#)

New Hardware Features in Release 12.2(33)SXH4

None.

New Software Features in Release 12.2(33)SXH4



Note

See the following site for information about supported MIBs:

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

- Radius Per-VRF Server Group—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_per_vrf_aaa.html
- TACACS+ Per VRF—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_vrf_tacas_svrs.html

New Features in Release 12.2(33)SXH3a

These sections describe the new features in Release 12.2(33)SXH3, 29 Sep 2008:

- [New Hardware Features in Release 12.2\(33\)SXH3a, page 145](#)
- [New Software Features in Release 12.2\(33\)SXH3a, page 145](#)

New Hardware Features in Release 12.2(33)SXH3a

None.

New Software Features in Release 12.2(33)SXH3a

None.

New Features in Release 12.2(33)SXH3

These sections describe the new features in Release 12.2(33)SXH3, 29 Jul 2008:

- [New Hardware Features in Release 12.2\(33\)SXH3, page 146](#)
- [New Software Features in Release 12.2\(33\)SXH3, page 146](#)

New Hardware Features in Release 12.2(33)SXH3

None.

New Software Features in Release 12.2(33)SXH3

**Note**

See the following site for information about supported MIBs:

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

SSH Keyboard Interactive Authentication—See this publication:

http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_secure_shell_v2.html

New Features in Release 12.2(33)SXH2a

These sections describe the new features in Release 12.2(33)SXH2a, 28 Apr 2008:

- [New Hardware Features in Release 12.2\(33\)SXH2a, page 146](#)
- [New Software Features in Release 12.2\(33\)SXH2a, page 146](#)

New Hardware Features in Release 12.2(33)SXH2a

None.

New Software Features in Release 12.2(33)SXH2a

None.

**Note**

Resolution of [CSCso05127](#) changed the [SPAN syntax and defaults](#).

New Features in Release 12.2(33)SXH2

These sections describe the new features in Release 12.2(33)SXH2, 31 Mar 2008:

- [New Hardware Features in Release 12.2\(33\)SXH2, page 147](#)
- [New Software Features in Release 12.2\(33\)SXH2, page 147](#)

New Hardware Features in Release 12.2(33)SXH2

- 16-port 10-Gigabit Ethernet X2 Switching Module (WS-X6716-10GE)
- 6,000 W DC power supply (PWR-6000-DC)

New Software Features in Release 12.2(33)SXH2



Note

See the following site for information about supported MIBs:

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

- Cisco Enhanced PoE (ePoE) Support—Refer to this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/voip.html#wpCisco_Enhanced_PoE_Support

New Features in Release 12.2(33)SXH1

These sections describe the new features in Release 12.2(33)SXH1, 18 Jan 2008:

- [New Hardware Features in Release 12.2\(33\)SXH1, page 147](#)
- [New Software Features in Release 12.2\(33\)SXH1, page 147](#)

New Hardware Features in Release 12.2(33)SXH1

- Anomaly Guard Module (WS-SVC-AGM-1-K9)—See this publication:
http://www.cisco.com/en/US/prod/collateral/modules/ps2706/end_of_life_c51-573493.html
- Traffic Anomaly Detector Module (WS-SVC-ADM-1-K9)—See this publication:
http://www.cisco.com/en/US/prod/collateral/modules/ps2706/end_of_life_c51-573493.html

New Software Features in Release 12.2(33)SXH1



Note

See the following site for information about supported MIBs:

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

- Multi-VRF Selection Using Policy Based Routing (PBR):
 - In releases where [CSCsv22779](#) is not resolved, Multi-VRF Selection Using PBR does not support the use of reflexive ACLs.
 - Adds hardware support for the **set ip vrf next-hop** command. Configure the **set ip vrf next-hop** command for policy based routing within the same VRF.

**Note**

The **set ip next-hop** command is supported only within the global context, not within the VRF context.

- See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_mltvrf_slct_pbr.html
- VSS (Virtual Switching System):
 - Supported only with CAT6000-VS-S720-10G/MSFC3 and the hardware listed in the “[Hardware Requirements](#)” section.
 - See these publications:
Cisco IOS Software Configuration Guide, Release 12.2(33)SXH and Later Releases, [Chapter 4](#), “[Configuring Virtual Switching Systems](#).”
The *Cisco IOS Virtual Switch Command Reference* at:
http://www.cisco.com/en/US/docs/ios/vswitch/command/reference/vs_book.html

**Note**

In releases earlier than Release 12.2(33) SXH2, the VSS feature and the lawful intercept feature cannot be configured together. (CSCsl77715)

- VSS - Fast Link Status Notification—See the “[Virtual Switching System Redundancy](#)” section.
- VSS - GOLD in Virtual Switching System—See the “[Diagnostics](#)” section.

New Features in Release 12.2(33)SXH

These sections describe the new features in Release 12.2(33)SXH, 20 Aug 2007:

- [New Hardware Features in Release 12.2\(33\)SXH, page 149](#)
- [New Software Features in Release 12.2\(33\)SXH, page 149](#)

**Note**

Release 12.2(33)SXH provides initial support with Cisco IOS software modularity images for these service modules:

- Services SPA Carrier (SSC; 7600-SSC-400) and IPsec SPA (SPA-IPSEC-2G)
- Application Control Engine (ACE) module (ACE10-6500-K9, ACE20-6500-K9)
- Communication Media Module (WS-SVC-CMM)
- BGP Reduction in Transient Memory Usage—Cisco IOS Release 12.2(33)SXH has implemented a reduction in transient memory usage by BGP when BGP updates are built.
- Process MIB Enhancements for Software Modularity—The CISCO-PROCESS-MIB has been enhanced to support Portable Operating System Interface (POSIX) operating systems such as Cisco Software Modularity. Cisco Software Modularity images have been updated to implement the enhanced CISCO-PROCESS-MIB. To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

New Hardware Features in Release 12.2(33)SXH

- Catalyst 6509-V-E chassis ([WS-C6509-V-E](#))
- Supervisor Engine 720-10GE (CAT6000-VS-S720-10G/MSFC3)
- Cisco ME 6500 Series Ethernet switches (ME6524)
- 8-port 10/100 Ethernet SPA TX (SPA-8X1FE-TX-V2)
- 4-port 10/100 Ethernet SPA TX (SPA-4X1FE-TX-V2)
- 1-port Channelized STM1/OC3 to DS0 SPA (SPA-1xCHSTM1/OC3)
- Cisco 1000BASE-T NEBS 3 ESD SFP (SFP-GE-T)

New Software Features in Release 12.2(33)SXH



Note

See the following site for information about supported MIBs:

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

- ANSI TIA-1057 LLDP - MED Support—See this publication:
http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_lldp-med.html
- Any Transport over MPLS (AToM): Ethernet over MPLS (EoMPLS)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/mp_12_vpns/configuration/12-2sx/mp-any-transport.html



Note

With a Cisco ME 6500 Series Ethernet Switch (ME6524), be aware of CSCsu50427.

- Any Transport over MPLS (AToM): Graceful Restart—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_atom_grace_rstrt.html
- ATM OAM Emulation—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/mp_12_vpns/configuration/12-2sx/mp-any-transport.html
- ATM Port Mode Packed Cell Relay over MPLS—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/mp_12_vpns/configuration/12-2sx/mp-any-transport.html
- AutoQoS—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/auto_qos.html
- AutoRP Enhancement—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_basic_cfg.html
- AutoSecure—See these publications:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/autosec.html>
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/sec_autosecure.html

- BGP Dynamic Neighbors—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_neighbor.html
- BGP Multicast Inter-AS (IAS) VPN—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_cfg_mc_vpn_sup.html
- BGP Support for BFD—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_adv_features.html
- BGP Support for Dual AS Configuration for Network AS Migrations—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_neighbor.html
- BGP Support for Fast Peering Session Deactivation—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_neighbor.html
- BGP Support for IP Prefix Import from Global Table into a VRF Table—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_sup_ip_pref.html
- BGP Support for Named Extended Community Lists—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_external_sp.html
- BGP Support for Next-Hop Address Tracking—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_adv_features.html
- BGP Support for Sequenced Entries in Extended Community Lists—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_external_sp.html
- BGP Support for TCP Path MTU Discovery per Session—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_neighbor.html
- Bidirectional Forwarding Detection (BFD) Standard Implementation—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bfd/configuration/guide/irb_bfd.html
- Call Admission Control for IKE—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_call_addmsn_ike.html
- Call Home—See these publications:
http://www.cisco.com/en/US/docs/routers/7200/configuration/feature_guides/callhome_7200.html
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/callhome.html>
- Certificate - ISAKMP Profile Mapping—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_cert_isakmp_map.html
- Certificate - Storage Location Specification—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_store_pki_cred.html
- Cisco IOS Login Enhancements—See these publications:
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/sec_login_enhance.html
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_login_enhance.html

- Cisco IOS Scripting w/ Tcl—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/netmgmt/configuration/guide/nm_script_tcl_xe.html
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_script_tcl.html
- CLI extension to allow vlan-range for enabling or disabling mac-address learning—See this publication:
http://www.cisco.com/en/US/docs/ios/lanswitch/command/reference/lsw_m1.html#mac-address-table_learning
- Config Logger Persistency—See this publication:
<http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/config-logger-6149.html>
- Configurable flow-creation control of acl denied flows—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/netflow.html#Configuring_Exclude_ACL-deny
- Configuration Change Notification and Logging—See this publication:
http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-logger.html
- Configuration Replace and Configuration Rollback—See this publication:
http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-rollback.html
- Consolidation of ACL Counter Values in Distributed Environment—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s6.html#GUID-1D17939B-1C8F-422C-83CE-64B096DAD13D>
- Contextual Configuration Diff Utility—See this publication:
http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-diff.html
- Digital Optical Monitoring (DOM) Phase 2—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s4.html#GUID-73B23B10-A62E-4F88-9F4D-F37A9C14D8D8>

**Note**

See this publication for additional information about DOM:

http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_8031.html

- Distributed forwarding Engines (3C/3CXL) for 67xx line cards—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.html
- Easy VPN Client RSA - Signature Support—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_easy_vpn_rsa.html
- Easy VPN Phase 5.0—See these publications:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_easy_vpn_rem.html
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_easy_vpn_srvr.html
- EasyVPN Phase 6—See this publication:
http://www.cisco.com/en/US/docs/ios/security/configuration/guide/sec_easy_vpn_rem.html

- EIGRP Support for Route Map Filtering—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/iproute_eigrp/configuration/guide/ire_sup_route_xe.html
http://www.cisco.com/en/US/docs/ios/iproute_eigrp/configuration/guide/ire_sup_route.html
- Embedded Event Manager (EEM) 2.3—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_eem_overview.html
- Enhanced hot-standby Fabric switchover time—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/nsfsso.html#Redundancy_Configuration_Guidelines_and_Restrictions
- Enhanced Tracking Support / Enhanced Object Tracking / EOT—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_eot_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-4t/iap-eot.html>
- Enhancing IPv6 Multicast shared-tree performance—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/mcastv6.html#IPv6_Multicast_Guidelines_and_Restrictions
- Ethernet Connectivity Fault Management (E-CFM)—See this publication:
http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_cfm.html
- Ethernet Operations, Administration, and Maintenance (OAM)—See these publications:
http://www.cisco.com/en/US/docs/ios/cether/configuration/guide/ce_oam.html
- Exclusive Configuration Change Access—See this publication:
http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_config-lock.html
- Extended ACL support for IGMP to support SSM in IPv4—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_customize_igmp.html
- FHRP - Enhanced Object Tracking of IP SLAs—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_eot_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-4t/iap-eot.html>

**Note**

FHRP - Enhanced Object Tracking of IP SLAs is not stateful switchover (SSO)-aware and cannot be used with Hot Standby Routing Protocol (HSRP), Virtual Router Redundancy Protocol (VRRP), or Gateway Load Balancing Protocol (GLBP) in SSO mode. (CSCtd31237)

- FHRP - Object Tracking List—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-4t/iap-eot.html>
- Front Side VRF—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfvpna.html#Configuring_VPNs_in_VRF_Mode
- GLBP MD5 Authentication—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-glbp.html
- GRE Tunnel IP Source and Destination VRF Membership—See this publication:
http://www.cisco.com/en/US/docs/ios/interface/configuration/guide/ir_impl_tun.html

- Hardware Acceleration for Multicast VPN Extranet Support—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_mc_vpn_extranet.html
- HSRP MD5 Authentication—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_hsrp_xe.html
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhrp-hsrp.html
- IEEE 802.1ab LLDP (Link Layer Discovery Protocol)—See this publication:
http://www.cisco.com/en/US/docs/ios/ceether/configuration/guide/ce_lldp-med.html
- IEEE 802.1Q Tagging on a Per-Port Basis—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1qtnl.html#Configuring_the_Switch_to_Tag_Native_VLAN_Traffic_Globally
- IEEE 802.1x Authenticator—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Device_Roles
- IEEE 802.1x - Auth Fail Open—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Inaccessible_Authentication_Bypass
- IEEE 802.1x - Auth Fail VLAN—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Inaccessible_Authentication_Bypass
- IEEE 802.1x Guest VLAN—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Guest_VLAN
- IEEE 802.1x Private Guest VLAN—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Inaccessible_Authentication_Bypass
- IEEE 802.1x Private VLAN Assignment—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Configuring_a_Guest_VLAN
- IEEE 802.1x RADIUS Accounting—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#802.1X_Accounting
- IEEE 802.1x Radius-Supplied Session Timeout—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Enabling_Periodic_Reauthentication
- IEEE 802.1x - Voice VLAN—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Voice_VLAN_Ports
- IEEE 802.1x - Wake on LAN Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Wake-on-LAN

- IEEE 802.1x with DHCP—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_DHCP_Snooping
- IEEE 802.1x with Port Security—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_Port_Security
- IGMP Filtering—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/igmpfilt.html>
- IGMP Snooping Enhancement: Global CGMP Auto-Detection—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooigmp.html#CGMP_Automatic_Detection
- Inline power IEEE power classification override—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/voip.html#Inline_Power_Management
- IP 16-way Equal-Cost Multipath—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_pi/command/reference/iri_pi1.html#maximum-paths
- IPSec Dead Peer Detection (DPD) Periodic Message Option—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_ipsec_dead_peer.html
- IPSEC Preferred Peer—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_ipsec_pref_peer.html
- IPSec VTI - Virtual Tunnel Interface—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_ipsec_virt_tunnel.html
- IPSG (IP Source Guard)—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/ipsrgrd.html>
- IP SLAs - DHCP Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_dhcp.html
- IP SLAs - Distribution of Statistics—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html
- IP SLAs - DNS Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_dns.html
- IP SLAs - FTP Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_ftp.html
- IP SLAs - HTTP Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_http.html

- IP SLAs - ICMP Echo Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_icmp_echo.html
- IP SLAs - ICMP Path Echo Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_icmp_pathecho.html
- IP SLAs - LSP Health Monitor—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_lsp_mon_autodisc.html
- IP SLAs - MPLS VPN Awareness—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html
- IP SLAs - Multi Operation Scheduler—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_multi_scheduler.html
- IP SLAs - One Way Measurement—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html
- IP SLAs - Path Jitter Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_icmp_pathjitter.html
- IP SLAs - Reaction Threshold—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_threshold_mon.html
- IP SLAs - Scheduler—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_overview.html
- IP SLAs - TCP Connect Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_tcp.html
- IP SLAs - UDP Based VoIP Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_udp_jitter_voip.html
- IP SLAs - UDP Echo Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_udp_echo.html
- IP SLAs - UDP Jitter Operation—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_udp_jitter.html
- IP SLAs - VoIP Threshold Traps—See this publication:
http://www.cisco.com/en/US/docs/ios/ipsla/configuration/guide/sla_threshold_mon.html
- IPv6: Anycast Address—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-addrg-bsc-con.html>
- IPv6 Default Router Preferences—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-addrg-bsc_con_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sx/ip6-addrg-bsc-con.html>
- IPv6 Multicast: Address Family Support for Multiprotocol BGP—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
- IPv6 Multicast: Explicit Tracking of Receivers—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html

- <http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
- IPv6 Multicast: MLD Access Group—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Multicast: PIM Accept Register—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Multicast: PIM Embedded RP Support—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Multicast: Routable Address Hello Option—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Multicast: RPF Flooding of Bootstrap Router (BSR) Packets—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Multicast: Static Multicast Routing (mroute) for IPv6—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-multicast_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-multicast.html>
 - IPv6 Routing: Multiprotocol BGP Extensions for IPv6—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-mptcl_bgp_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mptcl-bgp.html>
 - IPv6 Routing: Multiprotocol BGP Link-local Address Peering—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-mptcl_bgp_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-mptcl-bgp.html>
 - IPv6 Routing: Route Redistribution—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipv6/configuration/guide/ip6-is-is_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-is-is.html>
 - L2VPN Interworking—See this publication:
http://www.cisco.com/en/US/docs/ios/mppls/configuration/guide/mp_l2vpn_intrntwkg.html
 - L2VPN Interworking - Ethernet to VLAN Interworking—See this publication:
http://www.cisco.com/en/US/docs/ios/mppls/configuration/guide/mp_l2vpn_intrntwkg.html
 - L2VPN Interworking: Ethernet VLAN to ATM AAL5—See these publications:
http://www.cisco.com/en/US/docs/ios/mppls/configuration/guide/mp_l2vpn_intrntwkg.html
<http://www.cisco.com/en/US/docs/routers/10000/10008/configuration/guides/broadband/l2vpn.html>
http://www.cisco.com/en/US/products/hw/routers/ps368/products_installation_and_configuration_guides_list.html
 - L2VPN Interworking: Ethernet VLAN to Frame Relay—See these publications:
http://www.cisco.com/en/US/docs/ios/mppls/configuration/guide/mp_l2vpn_intrntwkg.html
<http://www.cisco.com/en/US/docs/routers/10000/10008/configuration/guides/broadband/l2vpn.html>

- L2VPN Interworking: Ethernet VLAN to PPP—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_l2vpn_intrntwkg.html
- L2VPN Interworking: Frame Relay to ATM AAL5—See these publications:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_l2vpn_intrntwkg.html
<http://www.cisco.com/en/US/docs/routers/10000/10008/configuration/guides/broadband/l2vpn.html>
- L2VPN Interworking: Frame Relay to PPP—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_l2vpn_intrntwkg.html
- LACP 1-1 redundancy with fast switchover—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/channel.html#Understanding_LACP_1:1_Redundancy
- Lawful Intercept (LI)—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/sec_user_services/configuration/guide/sec_lawful_intercept_xe.html
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/lawful/intercept/book.html>



Note In releases earlier than Release 12.2(33)SXH2, the VSS feature and the lawful intercept feature cannot be configured together. (CSCsl77715)

- Layer 2 Local switching - ATM-FR—See these publications:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fslocal.html
http://www.cisco.com/en/US/docs/ios/wan/configuration/guide/wan_l2_lcl_swng.html
- Layer 2 Local Switching - ATM to Ethernet—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fslocal.html
- MAC Address Notification—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/layer2.html#Configuring_MAC_Address_Table_Notification
- MAC Authentication Bypass—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_802.1X_Authentication_with_MAC_Authentication_Bypass
- Memory Pool - SNMP Notification Support—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_PPP_Bridging_Control_Protocol_Support
- MPLS LDP - Graceful Restart—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_ldp_grace_rstrt.html
- MPLS LDP - Session Protection—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_ldp_sessn_prot.html
- MPLS LDP - VRF Aware Static Labels—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_vrf_aware_static.html

- MPLS over RBE—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfcgadm.html#Configuring_MPLS_over_RBE
- MPLS Static Labels—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_static_labels.html
- MPLS Traffic Engineering - AutoTunnel Mesh Groups—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_autotun_mesh.html
- MPLS Traffic Engineering - FRR Scalability Enhancements—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/mp_te_path_protect/configuration/xe-3s/mp-te-frr-node-prot.html
- MPLS Traffic Engineering--Inter-AS TE—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_inter_as_te.html
- MPLS Traffic Engineering: Shared Risk Link Groups (SRLG)—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_shared_risk.html
- MPLS Traffic Engineering (TE) - AutoTunnel Primary and Backup—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_autotunnel.html
- MPLS Traffic Engineering (TE) - Class-based Tunnel Selection—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_tun_select.html
- MPLS Traffic Engineering (TE) - Fast Reroute (FRR) Link and Node Protection—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_frr_node_prot.html
- MPLS Traffic Engineering (TE) - LSP Attributes—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_lsp_attr.html
- MPLS Traffic Engineering (TE) - RSVP Hello State Timer—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_rsvp_hello.html
- MPLS Traffic Engineering (TE): Verbatim Path Support—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_verbatim_path.html
- MPLS VPN - Explicit Null Label Support with BGP IPv4 Label Session—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_ce_vpn_explicit.html
- MPLS VPN - Loadbalancing support for Inter-AS and CSC VPNs—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_load_share_vpn.html
- MPLS VPN - Multi-Path support for Inter-AS VPNs—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_interauto.html
- MPLS VPN - Route Target Rewrite—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_rte_target_rw.html
- MPLS VPN - Show Running VRF—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_show_run_vrf.html

- MSDP compliance with IETF RFC 3618—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_msdp_im_pim_sm.html
- MSDP MD5 password authentication—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipmulti/configuration/guide/imc_msdp_im_pim_sm_xe.html
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_msdp_im_pim_sm.html
- Multicast Vlan Registration (MVR)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/snooigmp.html#Understanding_MVR
- Multicast VPN Extranet Support—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_mc_vpn_extranet.html
- Multicast VPN Inter-AS Support—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_cfg_mc_vpn_sup.html
- Multicast VPN MIB—See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_vpn_mib.html
- Multilink Frame Relay (FRF.16.1) - Variable Bandwidth Class—See this publication:
http://www.cisco.com/en/US/docs/ios/wan/configuration/guide/wan_ml_fr_frf161.html
- Multi-VC to VLAN Scalability—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/760vwm.html#SIP-Dependent_Features
- MUX UNI Support—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/pfc3mpls.html#Configuring_MUX-UNI_Support_on_LAN_Cards
- NAC - Auth Fail Open—See these publications:
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/sec_nat_auth_fail_op.html
http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/ht_nacaf.html
- NAC - L2 IEEE 802.1x—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/dot1x.html#Using_Network_Admission_Control_Layer_2_IEEE_802.1X_Validation
- NAC - Network Admission Control—See these publications:
http://www.cisco.com/en/US/docs/ios/sec_user_services/configuration/guide/sec_net_admsn_ctrl.html
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/nac.html>
- Netflow MIB and Top Talkers—See this publication:
http://www.cisco.com/en/US/docs/ios/netflow/configuration/guide/cfg_nflow_top_talk.html
- Netflow Multicast Support—See this publication:
http://www.cisco.com/en/US/docs/ios/netflow/configuration/guide/cfg_nf_multi_acctg.html
- NetFlow Subinterface Support—See this publication:
http://www.cisco.com/en/US/docs/ios/netflow/configuration/guide/cfg_nflow_data_expt.html

- NSF - OSPF (RFC 3623 OSPF Graceful Restart)—See these publications:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_ospf/configuration/15-mt/iro-restart.html
- NSF / SSO - MPLS LDP and LDP Graceful Restart—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_ldp_grace_nsfssso.html
- NSF/SSO - MPLS TE and RSVP Graceful Restart—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_te_rsvp_grace.html
- NSF/SSO - MPLS VPN—See these publications:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vpn_nsfssso.html
- OER Border Router Only Functionality—See this publication:
http://www.cisco.com/en/US/docs/ios/ios_xe/pfr/configuration/guide/pfr-basic_xe.html
- OSPF Area Transit Capability—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_ospf/configuration/guide/iro_area_trans.html
- PBACL (Policy Based Access Control Lists)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/acl.html#Policy-Based_ACLS
- PBR Support for Multiple Tracking Options—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_pi/configuration/guide/iri_prb_mult_track.html
- Per Interface Netflow—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/netflow.html#Per_Interface_NetFlow
- Periodic MIB Data Collection and Transfer Mechanism—See this publication:
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_mib_collect_trans.html
- Per port VTP enable/disable—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vtp.html#Configuring_VTP_Mode_on_a_Per-Port_Basis
- Persistent Self-Signed Certificates—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_cert_enroll_pk_i.html
- Per-VRF Assignment of BGP Router-ID—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_router_id.html
- PIM Triggered Joins—See this publication:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipmulti/configuration/guide/imc_high_availability_xe.html
- Port-Based Access Control Lists (PACLs)—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vacl.html>
- Private Hosts—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/pvthost.html>

- QoS Support on Bridging Features—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#QoS_Traffic_Class_Configuration_Guidelines
- Reliable Static Routing Back-up using Object Tracking—See these publications:
http://www.cisco.com/en/US/docs/ios/dial/configuration/guide/dia_rel_stc_rtg_bckup.html
http://www.cisco.com/en/US/docs/ios/dial/configuration/guide/dia_rel_stc_rtg_bckup_ps6441_TSD_Products_Configuration_Guide_Chapter.html
- Reverse Route Injection (RRI)—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_rev_rte_inject.html
- Router Guard—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/igmpfilt.html#Understanding_Router_Guard
- RSVP Message Authentication—See this publication:
http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/rsvp_msg_auth.html
- Scalable EoMPLS (SIP-Based)—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Scalable_EoMPLS
- SmartPorts—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/smrtport.html>
- SNMP Support over VPN—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/netmgmt/configuration/guide/nm_cfg_snmp_sup_xe.html
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cfg_snmp_sup.html
http://www.cisco.com/en/US/docs/ios/netmgmt/configuration/guide/nm_cfg_snmp_sup.html#SNMP_Support_for_VPNs
- SPAN Destination Port Support On Etherchannels—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Local_SPAN,_RSPAN,_and_ERSPAN_Destinations
- SPAN Egress Session Increase—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Local_SPAN,_RSPAN,_and_ERSPAN_Session_Limits
- SSO - GLBP—See these publications:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ha/configuration/xe-3s/ha-config-stateful-switchover.html>
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-glbp.html
- SSO - HSRP—See these publications:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ha/configuration/xe-3s/ha-config-stateful-switchover.html>
http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_hsrp_xe.html
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhp-hsrp.html

- Support for MPLS-VPN Software Modularity—See this publication:
http://www.cisco.com/en/US/docs/ios/mps/configuration/guide/mp_ios_sw_mod_13_vpn.html
- Suppress BGP Advertisement for Inactive Routes—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_basic_net.html
- Switch Port Analyzer (SPAN) - CPU Source—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Source_CPUs
- Switch Port Analyzer (SPAN) - Distributed Egress SPAN—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Monitored_Traffic_Direction
- Switch Port Analyzer (SPAN) - Input Packets with Don't Learn Option—See these publications:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Configuring_ERSPAN
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Configuring_Local_SPAN
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Configuring_RSPAN
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/span.html#Local_SPAN,_RSPAN,_and_ERSPAN_Destinations



Note See the information about the **ingress** keyword.

- TCP MSS Adjust—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/ipapp/configuration/guide/ipapp_tcp_xe.html
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-2sx/iap-tcp.html>
- Two-Rate Policer—See these publications:
http://www.cisco.com/en/US/docs/ios/ios_xe/qos/configuration/guide/two_rate_policer_xe.html
http://www.cisco.com/en/US/docs/ios/qos/configuration/guide/two_rate_policer.html
- Universal Boot Loader—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/overview.html#Universal_Boot_Loader_Image
- Unknown Unicast Flood Rate-Limiting—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/blocking.html>
- VLAN Locking—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/vlans.html#VLAN_Locking
- VPLS Multiple VCs per Spoke—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Virtual_Private_LAN_Service_

- VRF Aware Multicast Error Messages—The VRF Aware Multicast Error Messages feature improves the troubleshooting of MPLS VPN environments by allowing service providers to track the multicast error messages that are associated with a particular MVPN customer.
- VRF Aware System Message Logging (Syslog)—See this publication:
http://www.cisco.com/en/US/docs/ios/mpls/configuration/guide/mp_vrf_aware_loggng.html
- Web Authentication Proxy—See this publication:
<http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/webauth.html>

Software Features from Earlier Releases

- 4000 ATM VCs per port adapter on the following FlexWAN ATM port adapters:
 - PA-A3-OC3MM
 - PA-A3-OC3SMI
 - PA-A3-OC3SML
 - PA-A3-T3
 - PA-A3-E3
 - PA-A6-OC3MM
 - PA-A6-OC3SMI
 - PA-A6-OC3SML
 - PA-A6-T3
 - PA-A6-E3
- 4096 Layer 2 VLANs—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[VLAN Ranges](#)” section in the “[Configuring VLANs](#)” chapter.



Note

We recommend that you configure a combined total of no more than 2,000 Layer 3 VLAN interfaces and Layer 3 ports.

- Any Transport over MPLS (AToM) Features:
 - Not supported with PFC3A
 - Supported on WAN ports
 - Ethernet over MPLS (EoMPLS)
 - Frame Relay over MPLS (FRoMPLS)
 - ATM Single Cell Relay over MPLS-VC Mode (CRoMPLS)
 - ATM AAL5 over MPLS (AAL5oMPLS)
 - HDLC over MPLS (HDLCoMPLS)—Note these guidelines and restrictions:
HDLCoMPLS supports core-facing ports only on Enhanced FlexWAN modules and Shared Port Adapter (SPA) Interface Processors (SIPs).

- PPP over MPLS (PPPoMPLS)—Note these guidelines and restrictions:

All PPP negotiations (for example, link control protocol [LCP] negotiations) and keepalives are end to end from CE to CE. The PE routers do not participate in PPP negotiations.

Multilink PPPoMPLS (MLPPPoMPLS) is not supported, but it can be emulated. To emulate MLPPPoMPLS, each member link of the MLPPP bundle on a CE requires a corresponding PPPoMPLS tunnel on the PE router that it directly connects to. For example, if an MLPPP bundle has three member links, you must configure three PPPoMPLS tunnels on each PE with each tunnel corresponding to a member link.

See this publication:

http://www.cisco.com/en/US/docs/ios-xml/ios/mp_12_vpns/configuration/12-2sx/mp-any-transport.html

- ATM Cell Loss Priority (CLP) Setting on FlexWAN module ATM interfaces—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html
- ATM OAM ping—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/12satmpng.html
- ATM VC access trunk emulation—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- ATM Virtual Circuit (VC) Bundling—See these publications:
http://www.cisco.com/en/US/docs/ios/12_2/qos/configuration/guide/qcfipaov.html
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsmu26s.html
- Autostate - Firewall Capability for the Firewall service module—See this publication:
http://www.cisco.com/en/US/products/hw/modules/ps2706/ps4452/tsd_products_support_model_home.html
- Bandwidth Command for HQoS Parent Class Support—See this publication:
[http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Virtual_Private_LAN_Service_\(VPLS\)](http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Virtual_Private_LAN_Service_(VPLS))
- BGP Configuration Using Peer Templates—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/s_bgpct.html
- BGP Cost Community—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/s_bgpcc.html
- BGP Dynamic Update Peer-Groups—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/s_bgpdpg.html
- BGP Increased Support of Numbered AS-path Access Lists to 500—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfbgp.html
- BGP multipath load sharing for both eBGP and iBGP in an MPLS-VPN—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/fsxeibmp.html

**Note**

With the BGP multipath load sharing for both eBGP and iBGP in an MPLS-VPN feature configured, do not attach output service policies to VRF interfaces. (CSCsb25509)

For nonMPLS environments, see the Interior Border Gateway Protocol (iBGP) Multipath Load Sharing feature.

- BGP Policy Accounting—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsbgppa.html
- BGP Restart Session After Max-Prefix Limit—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_bgp/configuration/guide/irg_neighbor.html#BGP_Neighbor_Session_Restart_After_the_Max-Prefix_Limit_Is_Reached
- BGP Route Map Continue—See this publication:
http://www.cisco.com/en/US/docs/ios/12_4t/12_4t4/t_bgprco.html
- BGP Route-Map Policy List Support—See this publication:
http://www.cisco.com/en/US/docs/ios/12_4t/12_4t4/t_bgprco.html
- BGP support for TTL security check—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_bgp/configuration/12-2sx/irg-neighbor.html
- Bidirectional Forwarding Detection (BFD) standard implementation—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fs_bfd.html

**Note**

Catalyst 6500 switches support BFD only on Ethernet, Fast Ethernet (except PA-2FE and PA-1FE), Gigabit Ethernet, and 10-Gigabit Ethernet ports, including Ethernet SPAs. The Catalyst 6500 switches and Cisco 7600 routers do not support BFD on PA-2FE or PA-1FE Ethernet LAN ports, or on POS, ATM, or serial WAN ports.

Also see “Integrated IS-IS support for BFD over IPv4” and “OSPF support for BFD over IPv4.”

- Bidirectional Protocol Independent Multicast (PIM) in hardware—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Understanding IPv4 Bidirectional PIM](#)” section in the “[Configuring IPv4 Multicast Layer 3 Switching](#)” chapter.
- Boot Protocol (BOOTP) relay—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/configfun/configuration/guide/fcf012.html
- Bridge Control Protocol (BCP)—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html
- Bridging using RFC1483 Routed Encapsulation (BRE)—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- Certificate Autoenrollment (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cert-enroll-pki.html

- Certificate Security Attribute-Based Access Control (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cfg-auth-rev-cert.html
- Cisco IOS IP Event Dampening—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_pi/configuration/12-2sx/iri-ip-event-damp.html
- IPv6 Switching: Provider Edge Router over MPLS (6PE) (not supported in PFC3A mode)—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/configuration/12-2sy/ip6-over-mpls.html>
- Cisco IOS Secure Copy (SCP)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_usr_ssh/configuration/12-2sx/sec-secure-copy.html
- Cisco IOS server load balancing (SLB):
 - GGSN-SLB Messaging
 - Home Agent Loadbalancing

See this publication:

http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/slbsxd1.html



Note

Web Cache Control Protocol (WCCP) Layer 2 PFC redirection is supported with Cisco IOS server load balancing (SLB). Other WCCP configurations are not compatible with Cisco IOS server load balancing (SLB).

- Cisco IOS server load balancing (SLB): interface-aware—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/slbsxe1.html
- Cisco IOS server load balancing (SLB): stateful failover within single chassis—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/slbsxe1.html
- Cisco IP Phone Support—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Cisco IP Phone Support](#)” chapter.
- Cisco Nonstop Forwarding (NSF) with stateful switchover (SSO) supervisor engine redundancy—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring NSF with SSO Supervisor Engine Redundancy](#)” chapter.



Note

- With PFC3, NSF with SSO supports multicast traffic.
- NSF with SSO redundancy mode supports IPv4. NSF with SSO redundancy mode does not support IPv6, IPX, or MPLS.
- These protocols can coexist with NSF with SSO redundancy mode, but there is no stateful support for them:
 - MPLS and LDP
 - GLBP
 - HSRP
 - VRRP

Following an NSF with SSO switchover, traffic loss occurs on the links where the protocols are configured until the protocols converge.

- Clear hardware interface counters—See this publication:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html
- CNS Interactive CLI—Network management applications can use the Cisco Networking Services (CNS) agents to manage network routers. The CNS agent provides the capability to send commands to a router from a programmable source. The CNS Interactive CLI feature introduces a new XML interface that allows you to send interactive commands to a router, such as commands that generate prompts for user input. A benefit of this feature is that interactive commands can be aborted before they have been fully processed. For example, for commands that generate a significant amount of output, the XML interface can be customized to limit the size of the output or the length of time allowed for the output to accumulate. The capability to use a programmable interface to abort a command before its normal termination (similar to manually aborting a command) can greatly increase the efficiency of diagnostic applications that might use this functionality. The new XML interface also allows for multiple commands to be processed in a single session. The response for each command is packaged together and sent in a single response event.
- Configurable Per VLAN MAC Learning (PVL)—See the **mac-address-table learning** command in this publication:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html
- Control Plane DSCP Support for RSVP—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/qos_rsvp/configuration/15-mt/rsvp-dscp-spt-for-rsvp.html
- Crypto Conditional Debug Support (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_vpnips/configuration/12-2sx/sec-crypto-debug-sup.html
- IEEE 802.1Q Custom Ethertype:
 - Supported on these modules:
 - Supervisor engines
 - WS-X6708-10GE
 - WS-X6704-10GE
 - WS-X6748-GE-TX
 - WS-X6748-SFP
 - WS-X6724-SFP
 - WS-X6816-GBIC
 - WS-X6516-GE-TX
 - WS-X6516A-GBIC
 - WS-X6516-GBIC

**Note**

The WS-X6516A-GBIC and WS-X6516-GBIC modules apply a configured custom EtherType field value to all ports supported by each port ASIC (1 through 8 and 9 through 16).

- In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “Configuring a Custom IEEE 802.1Q EtherType Field Value” section in the “Configuring LAN Ports for Layer 2 Switching” chapter.

- Data-link switching plus (DLSw+)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ibm/configuration/guide/bcfdlsw_external_docbase_0900e4b180753b82_4container_external_docbase_0900e4b180771fb6.html
- DE/CLP and EXP mapping on FR/ATMoMPLS VC—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/pfc3mpls.html#DE/CLP_and_EXP_Mapping_on_FR/ATMoMPLS_VC
- DHCP Option 82 on Untrusted Port—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Packet Validation](#)” section in the “[Configuring DHCP Snooping](#)” chapter.
- DHCP Snooping—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring DHCP Snooping](#)” chapter.
- Digital Optical Monitoring (DOM)—See the **show interfaces transceiver** command in this publication:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html

**Note**

See this publication for additional information about DOM:

http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_8031.html

- Directed broadcasts with the **mls ip directed-broadcast** command supported in hardware—See this publication:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html
- Distinguished Name-Based Crypto Maps (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_ikevpn/configuration/12-2sx/sec-dist-nm-cyrypto.html
- Distributed LFI (dLFI) and distributed QoS (dQoS) over Leased Lines on FlexWAN module interfaces—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/qos_latjit/configuration/15-mt/qos-mlppp-fr.html
- Distributed MLPPP (dMLPPP) on FlexWAN module interfaces—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html

**Note**

cRTP is not supported on dMLPPP bundled links.

- Distributed Multilink Frame Relay (FRF.16)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/dmfr.html
- Distributed network-based application recognition (dNBAR) on FlexWAN module interfaces—See this publication:
http://www.cisco.com/en/US/docs/ios/12_4t/qos/configuration/guide/qsnbar1.html
- Dynamic ARP Inspection (DAI)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Dynamic ARP Inspection](#)” chapter.
- Dynamic Host Configuration Protocol (DHCP)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfdhcp.html

- Dynamic Multipoint VPN (DMVPN) Phase 2 (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_dmvpn/configuration/15-s/sec-conn-dmvpn.html
- Easy VPN Server features (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_esyvpn/configuration/12-2sx/sec-easy-vpn-12-2sx-book.html
- EIGRP MPLS VPN PE-CE site of origin (SoO)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/s_mvessoo.html
- Embedded network management improvements—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/technical_references/7600_mib_guides/MIB_Guide_vr_6/mibgde6.html
- Encapsulated Remote SPAN (ERSPAN)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Local SPAN, RSPAN, and ERSPAN](#)” chapter.
- Encrypted Multicast over GRE (supported on SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/sipspasw.html
- Encrypted Preshared Key (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_ikevpn/configuration/12-2sx/sec-encrypt-preshare.html
- EtherChannel—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring EtherChannels](#)” chapter.
- EtherChannel Enhancement - 128 EtherChannels Support—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[EtherChannel Feature Overview](#)” section in the “[Configuring EtherChannels](#)” chapter.
- EtherChannel Min-Links—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “Configuring the EtherChannel Min-Links Feature” section in the “[Configuring EtherChannels](#)” chapter.
- Ethernet over MPLS (EoMPLS) per VLAN QoS—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfgeth.html#EoMPLS_Configuration_Example
- Flex Links—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “Configuring Flex Links” chapter.
- Frame Relay virtual circuit (VC) bundling—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- Gateway Load Balancing Protocol (GLBP)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fs_glb2.html
- Generic Online Diagnostics (GOLD)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Online Diagnostics](#)” chapter and the “[Online Diagnostic Tests](#)” appendix.
- Half-Bridging on FlexWAN ATM interfaces (CSCin27157)

- Hardware Capacity Monitoring—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Determining System Hardware Capacity](#)” section in the “[Power Management and Environmental Monitoring](#)” chapter.
- Hardware Control Plane Interface for Control Plane Policing (CoPP):
 - Release 12.2SX does not support CoPP output rate limiting (policing).
 - Release 12.2SX does not support the CoPP silent operation mode.
 - Release 12.2SX does not support the **match protocol arp** command.
 - Release 12.2SX automatically installs the CoPP service policy on all DFC-equipped switching modules.
 - In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Control Plane Policing](#)” chapter.
- Hardware-supported counters for hardware-supported ACLs, displayed by the **show tcam interface** command (not supported in PFC3A mode). See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/interface/command/ir-s6.html#GUID-1D17939B-1C8F-422C-83CE-64B096DAD13D>
- HQoS support for Ethernet over MPLS (EoMPLS) VC—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- H-VPLS with MPLS Edge—See this publication:
[http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Virtual_Private_LAN_Service_\(VPLS\)](http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/76cfsip.html#Configuring_Virtual_Private_LAN_Service_(VPLS))
- IDSM-2 EtherChannel load balancing—See this publication:
http://www.cisco.com/en/US/products/hw/modules/ps2706/ps5058/tsd_products_support_model_home.html
- IEEE 802.1Q protocol tunneling—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Layer 2 Protocol Tunneling](#)” chapter.
- IEEE 802.1Q tunneling—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring IEEE 802.1Q Tunneling](#)” chapter.
- IEEE 802.1s - Multiple Spanning Tree (MST) Standard Compliance—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Understanding MST](#)” section in the “[Configuring STP and MST](#)” chapter.
- IEEE 802.1w, rapid reconfiguration of spanning tree; also called Rapid-Per-VLAN-Spanning Tree (Rapid-PVST)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Understanding IEEE 802.1w RSTP](#)” section in the “[Configuring STP and MST](#)” chapter.
- IEEE 802.1X Port-Based Authentication—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring IEEE 802.1X Port-Based Authentication](#)” chapter.
- IEEE 802.3ad, link aggregation control protocol (LACP)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Understanding IEEE 802.3ad LACP EtherChannel Configuration](#)” section in the “[Configuring EtherChannels](#)” chapter.
- IGMP snooping and the IGMP snooping querier—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring IGMP Snooping and MVR for IPv4 Multicast Traffic](#)” chapter.

- IGMP Static Group Range Support—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/stgrpsxf.html
- IKE: Initiate Aggressive Mode (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_ikevpn/configuration/12-2sx/sec-aggr-mde-ike.html
- Integrated IS-IS global default metric—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_isis/configuration/15-mt/irs-netd.html
- Integrated IS-IS protocol shutdown support maintaining configuration parameters—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_isis/configuration/guide/irs_initcf.html
- Integrated IS-IS support for BFD over IPv4—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fs_bfd.html



Note Also see Bidirectional Forwarding Detection (BFD) standard implementation.

- Interior Border Gateway Protocol (iBGP) Multipath Load Sharing—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsbgpls.html



Note For MPLS support, see BGP Multipath Load Sharing for Both eBGP and iBGP in an MPLS-VPN.

- Internet Group Management Protocol Version 3 (IGMPv3) snooping—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[IGMP Version 3 Support Overview](#)” section in the “[Configuring IGMP Snooping and MVR for IPv4 Multicast Traffic](#)” chapter.
- Invalid Special Parameter Index (SPI) Recovery—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_dplane/configuration/12-2sx/sec-invalid-index-rec.html
- Inverse Multiplexing over ATM (IMA) on FlexWAN module interfaces—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html
- IP-in-IP tunneling and generic routing encapsulation (GRE) tunneling (hardware-assisted)—The PFC3 and DFC3s support the following tunnel commands:
 - **tunnel destination**
 - **tunnel mode gre**
 - **tunnel mode ipip**
 - **tunnel source**
 - **tunnel ttl**
 - **tunnel tos**

Other supported types of tunneling run in software on the MSFC3. The PFC3 does not provide hardware acceleration for tunnels configured with the **tunnel key** command.

The **tunnel ttl** command (default 255) sets the TTL of encapsulated packets.

The **tunnel tos** command, if present, sets the ToS byte of a packet when it is encapsulated. If the **tunnel tos** command is not present and QoS is not enabled, the ToS byte of a packet sets the ToS byte of the packet when it is encapsulated. If the **tunnel tos** command is not present and QoS is enabled, the ToS byte of a packet as modified by PFC QoS sets the ToS byte of the packet when it is encapsulated.

To configure GRE Tunneling and IP in IP Tunneling, refer to these publications:

http://www.cisco.com/en/US/docs/ios/12_2/interface/configuration/guide/icflogin.html

http://www.cisco.com/en/US/docs/ios/12_2/interface/command/reference/irfshoip.html

To configure the **tunnel tos** and **tunnel ttl** commands, refer to this publication:

http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/12s_tos.html

Note the following information about tunnels:

- Each hardware-assisted tunnel must have a unique source address. Hardware-assisted tunnels cannot share a source address even if the destination addresses are different. Use secondary addresses on loopback interfaces or create multiple loopback interfaces. Failure to use unique source addresses may result in control plane failures when software path congestion occurs. (CSCdy72539)
- Each tunnel interface uses one internal VLAN.
- Each tunnel interface uses one additional router MAC address entry per router MAC address.
- The PFC3A does not support any PFC QoS features on tunnel interfaces.
- The PFC3B and PFC3BXL support PFC QoS features on tunnel interfaces.
- In releases earlier than Release 12.2(18)SXE, the PFC3 does not support GRE tunnel encapsulation and de-encapsulation of multicast traffic.
- The MSFC supports tunnels configured with egress features on the tunnel interface. Examples of egress features are output Cisco IOS ACLs, NAT and PAT (for inside to outside translation), TCP intercept, and encryption.
- IP routing of RFC1483 ATM bridge encapsulation (RBE)—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- IPsec Anti-Replay Window: Expanding and Disabling—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_dplane/configuration/12-2sx/sec-ipsec-antireplay.html
- IP Security VPN Monitoring (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_imgmt/configuration/12-2sx/sec-ip-security-vpn.html
- IPsec VPN Accounting (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_imgmt/configuration/12-2sx/sec-ipsec-vpn-actg.html
- IPS Inline VLAN Pairing for WS-SVC-IDS-M2-K9—See this publication for more information:
<http://www.cisco.com/en/US/docs/security/ips/5.1/configuration/guide/cli/cliguide.html>
- IP Unnumbered for VLAN-SVI interfaces—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “Configuring Subinterfaces on Layer 3 Interfaces” section in the “Configuring Layer 3 Interfaces” chapter.

- IPv6 access services: DHCPv6 prefix delegation—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/config_library/15-sy/ipv6-15-sy-library.html
- IPv6—Hardware support for these basic IPv6 functions:
 - IPv6 standard access control lists (ACLs)
 - IPv6 extended ACLs
 - Reflexive ACLs
 - Manually configured v6 tunnels
 - ISATAP (ISATAP with 6-to-4 prefix is not supported in hardware)
 - Automatically configured IPv4 compatible tunnels
 - 6-to-4 tunnel
 - IPv6 over IPV4 IP in IP tunnels
- IPv6—Software support for these basic IPv6 functions:
 - IPv6 addressing architecture
 - ICMPv6
 - Neighbor Discovery
 - Static ND cache entry
 - IPv6 stateless autoconfiguration
 - ICMPv6 Redirect
 - MTU path Discovery for IPv6
 - IPv6 ICMP rate limiting
 - IPv6 over IPV4 GRE tunnels
- IPv6—Software support for IPv6 routing:
 - Static routes within IPv6
 - RIPng
 - MP-BGP4
 - OSPFv3
 - ISIS
 - Configuring an IPv6 Multiprotocol BGP Peer using a link local address
 - IPv6 MP-BGP distance command
- IPv6—Switching support for IPv6:
 - Process
 - CEFv6
 - Distributed CEFv6
- IPv6—Software support for these IPv6 applications:
 - Ping
 - Traceroute
 - Telnet
 - TFTP (client only)

- FTP
- SSH over IPv6
- DNS
- HTTP server

For configuration information, refer to this publication:

http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/config_library/15-sy/ipv6-15-sy-library.html

For command reference information, refer to this publication:

http://www.cisco.com/en/US/docs/ios/ipv6/command/reference/ipv6_book.html

- IPv6 hardware: multicast assist—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring IPv6 Multicast PFC3 and DFC3 Layer 3 Switching](#)” chapter.
- IPv6 multicast: Bootstrap Router (BSR)—See the BSR information in the *Cisco IOS IPv6 Configuration Library* and the *Cisco IOS IPv6 Command Reference*.
- IPv6 Multicast: HW assisted egress replication—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Displaying the Replication Mode Auto Detection Status](#)” section in the “[Configuring IPv6 Multicast PFC3 and DFC3 Layer 3 Switching](#)” chapter.
- IPv6 multicast RPR support—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring RPR Supervisor Engine Redundancy](#)” chapter.
- IPv6 QoS: (quality of service)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[General Guidelines](#)” section in the “[Configuring PFC QoS](#)” chapter.
- IPv6 Support on WAN Interfaces—See this publication:
http://www.cisco.com/en/US/tech/tk872/tech_white_papers_list.html
- IS-IS caching of redistributed routes—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/isredrib.html
- IS-IS Incremental SPF—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/isisispsf.html
- IS-IS Limit on Number of Redistributed Routes—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsiredis.html
- IS-IS Mechanisms to Exclude Connected IP Prefixes from LSP Advertisements—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsisiadv.html
- IS-IS support for priority-driven IP prefix RIB installation—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fslocrib.html
- IS-IS Support for Route Tags—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_isis/configuration/15-mt/irs-isis-supp-route-tags.html

- Jumbo frames on all Ethernet ports except ports on the WS-X6548-GE-TX, WS-X6548V-GE-TX, WS-X6148-GE-TX, and WS-X6148V-GE-TX switching modules.

**Caution**

The following switching modules support a maximum ingress frame size of 8092 bytes:

- WS-X6516-GE-TX when operating at 100 Mbps
- WS-X6148-RJ-45, WS-X6148-RJ-45V and WS-X6148-RJ21, WS-X6148-RJ21V
- WS-X6248A-RJ-45
- WS-X6348-RJ-45, WS-X6348-RJ45V and WS-X6348-RJ21V

When jumbo frame support is configured, these modules drop ingress frames larger than 8092 bytes.

- Key rollover for certificate renewal—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cert-enroll-pki.html
- L3 MPLS VPN over GRE on 7600-SIP-400—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/sipspasw.html
- Layer 2 switch ports and VLAN trunks with the Dynamic Trunking Protocol (DTP), including support on Gigabit Ethernet ports for jumbo frames—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring LAN Ports for Layer 2 Switching](#)” chapter.
- Layer 2 traceroute—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Using the Layer 2 Traceroute Utility](#)” chapter.
- Link Fragmentation and Interleaving (LFI) for FlexWAN Frame Relay interfaces and ATM Virtual Circuits—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/qos-latjit/configuration/15-mt/qos-mlppp-fr.html>
- The [ip local-proxy-arp](#) command.

**Note**

To use the local proxy ARP feature, you must enable the IP proxy ARP feature. The IP proxy ARP feature is enabled by default. See the [ip proxy-arp](#) command documentation.

- Low Latency Queueing (LLQ) and Class-based Weighted Fair Queueing (CBWFQ) on FlexWAN MLPPP links—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/qos/configuration/guide/fqos_c.html
- MAC address-based traffic blocking—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring MAC Address-Based Traffic Blocking](#)” section in the “[Configuring Network Security](#)” chapter.
- Manual Certificate Enrollment (supported with SPA-IPSEC-2G):
 - Also called TFTP and Cut-and-Paste
 - See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cert-enroll-pki.html

- Mapping a subinterface to an EoMPLS VC on 7600-SIP-400—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/sipspasw.html
- match cos classification on 7600-SIP-400—See this publication:
http://www.cisco.com/en/US/docs/interfaces_modules/shared_port_adapters/configuration/6500series/sipspasw.html
- MLD snooping—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “Configuring MLD Snooping for IPv6 Multicast Traffic” chapter.
- MPLS Basic, including Provider (P) and Provider Edge (PE) functionality (MPLS; not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/configuration/guide/pfc3mpls.html#Basic_MPLS_Load_Balancing
- MPLS Label Distribution Protocol (LDP; not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/12.2SX_OSM_config/mpls.html#MPLS_Support_on_OSMs
- MPLS LDP - Inbound Label Binding Filtering—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsinbd4.html
- MPLS LSP ping/traceroute and AToM VCCV—See this publication:
http://www.cisco.com/en/US/docs/ios/12_4t/12_4t11/ht_lspng.html
- MPLS Traffic Engineering DiffServ Aware (DS-TE)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsdserv3.html

**Note**

Also see MPLS Traffic Engineering (TE) Fast Reroute (FRR) Link and Node Protection. MPLS DS-TE is not supported on these interface types:

- Port channel interfaces
- Switch virtual interfaces (SVIs)
- Multiple link point-to-point protocol (MLPPP) interfaces
- Multilink Frame Relay (MLFR or MFR)

- MPLS Traffic Engineering Forwarding Adjacency—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fstefa_3.html
- MPLS Traffic Engineering (TE) Fast Reroute (FRR) Link and Node Protection—See these publications:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsfr24.html

**Note**

Also see MPLS Traffic Engineering DiffServ Aware (DS-TE). MPLS TE FRR Link and Node Protection is not supported on these interface types:

- Port channel interfaces
- Switch virtual interfaces (SVIs)
- Multiple link point-to-point protocol (MLPPP) interfaces
- Multilink Frame Relay (MLFR or MFR)

- MPLS Traffic Engineering (TE) Interarea Tunnels—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsiarea3.html
- MPLS Virtual Private Networks (MPLS VPN; not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsmvpns.html
- MPLS VPN Carrier Supporting Carrier (not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fs2scsc.html
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fscscbl.html
- MPLS VPN—Inter-AS—IPv4 BGP Label Distribution (not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fsiaslbl.html
- MPLS VPN—OSPF and Sham-Link Support (not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/ios/iproute_ospf/configuration/guide/iro_sham_link.html
- MPLS VPN ID (not supported in PFC3A mode)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/vpnid2.html
- MPLS VPN support for EIGRP between Provider Edge (PE) and Customer Edge (CE) —See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_eigrp/configuration/12-2sx/ire-mpls-vpn.html



Note The MPLS VPN support for EIGRP between Provider Edge (PE) and Customer Edge (CE) feature also provides EIGRP support for VRF Lite.

- MQC: distribution of remaining bandwidth (supported only on WAN ports)—You configure QoS features on an interface using the modular QoS CLI (MQC). Using MQC, you create service policies for traffic classes and attach the policies to an interface. You can use MQC to specify how the remaining bandwidth is distributed among the interface or subinterface output queues. The remaining bandwidth is the available bandwidth left on an interface or subinterface after all guaranteed traffic is accounted for. The amount of remaining bandwidth available for use is determined by the excess information rate (EIR) configured for the queue.

The **bandwidth remaining percent** command allows you to configure the remaining bandwidth for output queues. The aggregate of all user-configured EIR bandwidth percentages cannot exceed 100 percent. If the aggregate of all remaining bandwidth is less than 100 percent, the remainder is evenly split among user queues (including the default queue) that do not have a remaining bandwidth percentage configured. The minimum EIR value of each output queue is 1.

This example shows how to use the **bandwidth remaining percent** command to distribute percentages of remaining bandwidth to various traffic classes in a policy map:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# policy-map myPolicy
Router(config-pmap)# class class-default
Router(config-pmap-c)# bandwidth remaining percent 20
Router(config-pmap-c)# class prec1
Router(config-pmap-c)# bandwidth remaining percent 30
Router(config-pmap-c)# class prec2
Router(config-pmap-c)# bandwidth remaining percent 10
Router(config-pmap-c)# bandwidth percent 50
Router(config-pmap-c)# end
```

```

Router# show policy-map myPolicy
  Policy Map myPolicy
    Class prec1
      bandwidth remaining percent 30
    Class prec2
      bandwidth percent 50
      bandwidth remaining percent 10
    Class class-default
      bandwidth remaining percent 20
Router#

```

- Multicast enhancement - egress replication performance improvement and Multicast Enhancement - Replication Mode Detection—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring the Replication Mode](#)” and “[Enabling Local Egress Replication](#)” sections in the “[Configuring IPv4 Multicast Layer 3 Switching](#)” chapter.
- Multicast-VPN: Multicast Support for MPLS VPN—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring IPv4 Multicast VPN Support](#)” chapter.

**Note**

Support for MVPN also includes support for multicast VRF (MVRF). MVRF is also known as multicast over VRF-lite. MVPN and MVRF are supported in PFC3B or PFC3BXL mode and PFC3C or PFC3CXL mode.

- Multiple-Hot Standby Routing Protocol (MHSRP)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfip.html
- Multiple RSA Key Pair Support (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-deploy-rsa-pki.html
- Multipoint bridging (MPB)—See these publications:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html
- NAC - L2 IP; Network Admission Control (NAC) Layer 2 Layer 2 IP validation—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Network Admission Control](#)” chapter.
- NetFlow Aggregation (hardware assisted)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring NetFlow Aggregation](#)” section in the “[Configuring NetFlow](#)” chapter.
- NetFlow - Bridged Flow Statistics—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Enabling NetFlow for Ingress-Bridged IP Traffic](#)” section in the “[Configuring NetFlow](#)” chapter.
- NetFlow Data Export (NDE)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring NDE](#)” chapter.

- NetFlow multicast support:
 - Supported only with NetFlow v9 export format.
 - See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/netflow/configuration/12-2sx/cfg-nf-multi-acctg.html>
 - The NetFlow Multicast Support document contains a prerequisite that does not apply when configuring NetFlow multicast support with Release 12.2(18)SXF and later 12.2SX releases:
 You do not need to configure multicast fast switching or multicast distributed fast switching (MDFS); multicast CEF switching is supported with Release 12.2(18)SXF and later 12.2SX releases.
- NetFlow Multiple Export Destinations:
 - Allows entry of a second **ip flow-export destination** command
 - See In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring the NDE Destination](#)” section in the “[Configuring NDE](#)” chapter.
- NetFlow v9 Export Format, including NetFlow Export of BGP Nexthop Information—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/netflow/configuration/12-2sx/cfg-nflow-data-expt.html>
- Network Address Translation (NAT) and Port Address Translation (PAT) for IPv4 unicast and multicast traffic (hardware assisted)—Note the following information about hardware-assisted NAT:
 - The PFC3A does not support NAT or PAT for UDP traffic.



Note PFC3B and PFC3BXL modes support NAT and PAT for UDP traffic.

- The PFC3 does not support NAT or PAT for multicast traffic.
- The PFC3 does not support NAT or PAT configured with a route map that specifies length.
- The PFC3 does not support NAT or PAT configured with a route map that specifies static translations.
- When you configure NAT or PAT and NDE on an interface, the PFC3 sends all traffic in fragmented packets to the MSFC3 to be processed in software. (CSCdz51590)

To configure NAT or PAT, refer to the Cisco IOS IP Configuration Guide, Release 12.2, “IP Addressing and Services,” “Configuring IP Addressing,” “Configuring Network Address Translation,” at this URL:

http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfipadr.html

For information about configuring NAT or PAT with route maps, refer to this publication:

http://www.cisco.com/en/US/tech/tk648/tk361/technologies_q_and_a_item09186a00800e523b.shtml

To prevent a significant volume of NAT or PAT traffic from being sent to the MSFC, due to either a DoS attack or a misconfiguration, enter the **mls rate-limit unicast acl {ingress | egress}** command described in this publication:

http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html

(CSCea23296)

- Optimized ACL logging (supported only with PFC3)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Optimized ACL Logging](#)” section in the “[Understanding Cisco IOS ACL Support](#)” chapter.
- OSPF Forwarding Address Suppression in Translated Type-5 LSAs—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_ospf/configuration/12-2sx/iro-for-add-sup.html
- OSPF Inbound Filtering Using Route Maps with a Distribute List—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/routemap.html
- OSPF Incremental Shortest Path First (i-SPF)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/ospfispf.html
- OSPF Limit on Number of Redistributed Routes—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsoredis.html
- OSPF link-local signaling (LLS) per interface basis—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/ospflls.html
- OSPF link state database overload protection—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/ospfopro.html
- OSPF MIB support of RFC 1850 and latest extensions—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/technical_references/7600_mib_guides/MIB_Guide_ver_6/mibgde6.html
- OSPF Shortest Path First Throttling—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2s/feature/guide/fs_spftrl.html
- OSPF support for BFD over IPv4—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fs_bfd.html



Note Also see “Bidirectional Forwarding Detection (BFD) standard implementation.”

- OSPF Support for Fast Hellos—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fasthelo.html
- OSPF support for forwarding adjacencies over MPLS traffic engineered tunnels—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/ospffa.html
- OSPF Support for Link State Advertisement (LSA) Throttling—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsolsath.html
- OSPF support for unlimited software VRFs per provider edge (PE) router—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/iproute_ospf/configuration/12-2sx/iro-un-sw-vrfs.html
- Packet classification based on layer3 packet-length (supported on WAN ports)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/qos_classn/configuration/12-2sx/qos-classn-ntwk-trfc.html

- Per Interface Sticky ARP—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Sticky ARP](#)” section in the “[Configuring Denial of Service Protection](#)” chapter.
- Per port MAC limiting—See the **mac-address-table limit** command in this publication:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html
- PFC3 hardware support for IPv4 multicast over point-to-point GRE tunnels—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/interface/configuration/guide/icflogin.html



Note Releases earlier than Release 12.2(18)SX-E supported IPv4 multicast over point-to-point GRE tunnels in software on the MSFC. The PFC3 does not provide hardware acceleration for tunnels configured with the **tunnel key** command.

- PFC QoS—PFC-hardware assisted Quality of Service (QoS)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring PFC QoS](#)” chapter.
- PFC QoS ARP ACLs for QoS Filtering—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring ARP ACLs for QoS Filtering](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS DSCP-based Queue Mapping (supported on WS-X6708-10GE and CAT6000-VS-S720-10G/MSFC3)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring DSCP-Based Queue Mapping](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS DSCP transparency (also called Received ToS byte preservation)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring DSCP Transparency](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS egress ACL support for remarked DSCP—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Enabling Egress ACL Support for Remark DSCP](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS egress DSCP mutation—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Egress DSCP Mutation](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS egress policing for LAN ports configured as Layer 3 interfaces and for VLAN interfaces—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Attaching a Policy Map to an Interface](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS features on tunnels (not supported in PFC3A mode)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[PFC QoS Configuration Guidelines and Restrictions](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS filtering in MAC ACLs per-VLAN and CoS-based (not supported in PFC3A mode)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring MAC ACLs](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS - Ignore Port Trust—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Enabling Ignore Port Trust](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS Ingress CoS mutation on IEEE 802.1Q tunnel ports—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Ingress CoS Mutation on IEEE 802.1Q Tunnel Ports](#)” section in the “[Configuring PFC QoS](#)” chapter.

- PFC QoS Protocol-Independent MAC ACL Filtering (not supported in PFC3A mode)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Protocol-Independent MAC ACL Filtering](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS SRR (Shaped Round Robin)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Allocating Bandwidth Between Standard Transmit Queues](#)” section in the “[Configuring PFC QoS](#)” chapter.
- PFC QoS user-based microflow policing—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Microflow Policers](#)” section in the “[Configuring PFC QoS](#)” chapter for information about configuring microflow policing based on either source or destination addresses.
- PIM Snooping—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring PIM Snooping](#)” chapter.
- PIM snooping DR flooding enhancement—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Disabling PIM Snooping Designated-Router Flooding](#)” section in the “[Configuring PIM Snooping](#)” chapter.
- PKI AAA authorization using the entire subject name—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cfg-auth-rev-cert.html
- Policy-based routing (PBR) with hardware assist for route-map sequences that use the **match ip address**, **set ip next-hop**, and **set ip default next-hop** PBR keywords.

To configure PBR, refer to the *Cisco IOS Quality of Service Solutions Configuration Guide*, Release 12.2, “Classification,” “Configuring Policy-Based Routing,” at this URL:

http://www.cisco.com/en/US/docs/ios/12_2/qos/configuration/guide/qcftpbr.html

When configuring PBR, follow these guidelines and restrictions:

- Releases earlier than Release 12.2(33)SXH use the syntax from Release 12.1, which supports **preempt** as a keyword for the **standby priority** command. Release 12.2(33)SXH and later releases use the Release 12.2 syntax, which requires **standby preempt** and **standby priority** to be entered as separate commands:
http://www.cisco.com/en/US/docs/ios/ipapp/command/reference/iap_s5.html#standby_priority
http://www.cisco.com/en/US/docs/ios/ipapp/command/reference/iap_s5.html#standby_preempt
- The PFC provides hardware support for PBR configured on a tunnel interface.
- The PFC does not provides hardware support for PBR configured with the **set ip next-hop** keywords if the next hop is a tunnel interface.
- If the MSFC address falls within the range of a PBR ACL, traffic addressed to the MSFC is policy routed in hardware instead of being forwarded to the MSFC. To prevent policy routing of traffic addressed to the MSFC, configure PBR ACLs to deny traffic addressed to the MSFC. (CSCse86399)
- Any options in Cisco IOS ACLs that provide filtering in a PBR route map that would cause flows to be sent to the MSFC3 to be switched in software are ignored. For example, logging is not supported in ACEs in Cisco IOS ACLs that provide filtering in PBR route maps.
- PBR traffic through switching module ports where PBR is configured is routed in software if the switching module resets. (CSCee92191)

- Port Security, including Port security on 802.1Q tunnel ports, port security on private VLAN ports, port security on trunk ports, port security with 4096 secure MAC addresses, and port security with sticky MAC addresses—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Port Security](#)” chapter.
- Private VLANs—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Private VLANs](#)” chapter.
- Protected private key storage—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-deploy-rsa-pki.html
- QoS: Aggregated DSCP / Precedence Values for WRED (supported on for 7600-SIP-400 ATM SPAs)—Aggregates multiple DSCP or IP Precedence values for a single minimum or maximum threshold and marks probability when specifying WRED parameters for 7600-SIP-400 ATM SPAs.
- QoS: ingress shaping on FlexWAN module interfaces—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html
- QoS Data Export—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring PFC QoS Statistics Data Export](#)” chapter.
- QoS: percentage based policing on WAN ports—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/12spctpg.html
- Query mode definition per trustpoint—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cfg-auth-rev-cert.html
- Query multiple servers during certificate revocation check—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cfg-auth-rev-cert.html
- RADIUS Load Balancing (RLB) IMSI sticky—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/slbsxe1.html
- Real-Time Resolution for IPsec Tunnel Peer (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_vpnnav/configuration/12-2sx/sec-realtime-ipsec.html
- Re-enroll using existing certificate—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cert-enroll-pki.html
- Remote SPAN (RSPAN)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Local SPAN, RSPAN, and ERSPAN](#)” chapter.
- RFC-1483 Bridging on FlexWAN—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/12.2SX_OSM_config/atm.html
- RFC 1483 Spanning-Tree Interoperability Enhancements on WAN ports—See these publications:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/features.html
- RFC-1490 bridging on FlexWAN interfaces—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/flexwan_config/flexwan-config-guide.html

- RFC 1889 Compressed Real-Time Protocol (cRTP) on FlexWAN interfaces—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/qos/configuration/guide/qcfcrtmp.html



Note cRTP is not supported on MLPPP bundled links.

- Route Processor Redundancy (RPR)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring RPR Supervisor Engine Redundancy](#)” chapter.
- Router-Port Group Management Protocol (RGMP)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfrgmp.html
- RSVP Interface-based Receiver Proxy—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2sx/feature/guide/rsvpprox.html
- RSVP Refresh Reduction and Reliable Messaging—See this publication:
http://www.cisco.com/en/US/docs/ios/12_0s/feature/guide/fsrelmsg.html
- RSVP Scalability Enhancements—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/qos_rsvp/configuration/12-2sx/rsvp-scalability.html
- RSVP Scalability Enhancements—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/qos_rsvp/configuration/12-2sx/rsvp-scalability.html
- SafeNet IPsec VPN client support—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_vpnips/configuration/12-2sx/sec-safenet-support.html
- SCP health monitoring for enhanced-FlexWAN—The SCP health monitor feature provides improved debugging capabilities for problems that cause WAN module resets because of SCP keepalive failures.
- Secure Shell SSH Version 2 Client Support—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_usr_ssh/configuration/12-2sx/sec-secure-shell-v2.html
- Secure Shell (SSH) Version 2 server support in k9 images—By default, the k9 images support both SSHv1 connections and SSHv2 connections. To restrict connections to either SSHv1 or SSHv2, enter the **ip ssh mode [v1 | v2]** global configuration mode command. Except for the **v1** and **v2** keywords for the **ip ssh mode** command, you configure SSHv2 in the same way as SSHv1. See this publication for more information:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_usr_ssh/configuration/12-2sx/sec-usr-ssh-12-2sx-book.html
For information about SSHv1 client support, refer to the following publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_usr_ssh/configuration/12-2sx/sec-usr-ssh-12-2sx-book.html
- Show diagnostic sanity—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Diagnostic Sanity Check](#)” section in the “[Configuring Online Diagnostics](#)” chapter.
- Show Top-N—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Using Top-N Reports](#)” chapter.

- SNMP ifindex persistence—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring SNMP IfIndex Persistence](#)” chapter.
- Source Interface Selection for Outgoing Traffic with Certificate Authority (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-sis-with-ca.html
- Source Specific Multicast (SSM) Mapping:
 - Do not configure SSM mapping in a VLAN that supports IGMPv3 multicast receivers.
 - See this publication:
http://www.cisco.com/en/US/docs/ios/ipmulti/configuration/guide/imc_basic_cfg.html#SSM_Overview
- Source-Specific Multicast with IGMPv3, IGMP v3lite, and URL Rendezvous Directory (URD)—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfssm.html
- SPAN—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Local SPAN, RSPAN, and ERSPAN](#)” chapter.
- SPAN destination port permit list—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Destination Port Permit Lists \(Optional\)](#)” section in the “[Configuring Local SPAN, RSPAN, and ERSPAN](#)” chapter.
- Spanning tree PortFast BPDU filtering, PortFast, UplinkFast, and BackboneFast, and Root Guard Feature—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Optional STP Features](#)” chapter.
- Spanning Tree Protocol (STP)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring STP and MST](#)” chapter.
- SSM mapping for IPv6—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipv6/config_library/15-sy/ipv6-15-sy-library.html
- Standard Domain Naming System (DNS) support—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/ip/configuration/guide/1cfipadr.html
- Strict priority low latency queueing (LLQ) on WAN ports—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/12.2SX_OSM_config/pwan.html#Configuring_Strict_Priority_Low_Latency_Queueing_LLQ_Support_on_the_OSM-2+4GE-WAN+
http://www.cisco.com/en/US/docs/routers/7600/install_config/12.2SX_OSM_config/pos.html#Configuring_Strict_Priority_LLQ_Support_on_POS_Optical_Service_Modules
- TCP intercept (hardware-assisted)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring TCP Intercept](#)” section in the “[Configuring Network Security](#)” chapter.
- TDR cable diagnostics—TDR is supported on these switching modules:
 - WS-X6148-GE-TX
 - WS-X6148V-GE-TX
 - WS-X6148-GE-45AF
 - WS-X6548-GE-TX
 - WS-X6548V-GE-TX
 - WS-X6548-GE-45AF

- WS-X6748-GE-TX
- WS-X6148A-GE-TX
- WS-X6148A-GE-45AF
- WS-X6148A-RJ-45
- WS-X6148A-45AF



Note TDR can test cables up to a maximum length of 115 meters.

See these publications:

- In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Checking the Cable Status Using the TDR](#)” section in the “[Configuring Interfaces](#)” chapter.
- The **test cable-diagnostics** command in the command reference at this URL:
http://www.cisco.com/en/US/docs/ios/mcl/allreleasemcl/all_book.html
- Traffic storm control—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Traffic Storm Control](#)” chapter.
- Trusted Root Certification Authority (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_cfg_cert_auth_io_OBS.html
- Trustpoint CLI (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/sec_conn_pki/configuration/12-2sx/sec-cert-enroll-pki.html
- UDI - Unique Device Identifier—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/fundamentals/configuration/12-2sx/Unique_Device_Identifier_Retrieval.html
- Unicast flood blocking (UFB)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Unknown Unicast Flood Control](#)” chapter.
- Unicast Reverse Path Forwarding (Unicast RPF), hardware-assisted, multiple-path—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Unicast Reverse Path Forwarding Check](#)” section in the “[Configuring Network Security](#)” chapter.
- UniDirectional Link Detection—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring UDLD](#)” chapter.
- Uni-Directional Link Routing (UDLR)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring UDE and UDLR](#)” chapter.
- VLAN Access Control Lists (VACLs)—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring Port ACLs and VLAN ACLs](#)” chapter.
- VACL capture—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring a Capture Port](#)” section in the “[Configuring Port ACLs and VLAN ACLs](#)” chapter.



Note VACL capture is not supported on WS-X6708-10GE ports.

- VACL Deny Logging—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring VACL Logging](#)” section in the “[Configuring Port ACLs and VLAN ACLs](#)” chapter.
- Virtual Router Redundancy Protocol (VRRP)—See this publication:
http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp_fhrp/configuration/12-2sx/fhrp-vrrp.html
- VLANs—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring VLANs](#)” chapter.
- VLANs over IP unnumbered sub-interfaces—See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipaddr/command/ipaddr-i4.html#GUID-833D9D25-1E04-4430-84D8-1AA836DE4745>
- VLAN translation—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring VLAN Translation](#)” section in the “[Configuring VLANs](#)” chapter.
- VLAN Trunk Protocol (VTP) and VTP domains—In the *Cisco IOS Software Configuration Guide*, Release 12.2(33)SXH and Later Releases, see the “[Configuring VTP](#)” chapter.
- Voice over Frame Relay (VoFR) FRF.11 and FRF.12 for FlexWAN interfaces—See this publication:
http://www.cisco.com/en/US/docs/ios/12_2/voice/configuration/guide/vvfvofr.html



Note Because Release 12.2SX does not support voice modules, switches supported in Release 12.2SX can act only as a VoFR tandem switch when FRF.11 or FRF.12 is configured on the FlexWAN module.

- VRF Aware IPsec (supported with SPA-IPSEC-2G)—See this publication:
http://www.cisco.com/en/US/docs/ios/sec_secure_connectivity/configuration/guide/sec_vrf_aware_ipsec.html
- VRF Lite (Multi-VRF for CE Routers) with IPv4 forwarding between VRFs interfaces, IPv4 ACLs, and IPv4 HSRP (supported on LAN and WAN ports)—See this publication:
http://www.cisco.com/en/US/docs/routers/7600/install_config/12.2SX_OSM_config/mpls.html#Configuring_MPLS



Note Multi-VRF for CE Routers (VRF Lite) with the PFC3 supports multi-VRF CE functionality with EIGRP, OSPF, BGP and RIPv2 routing protocols running on a per VRF basis. Static routes are also supported.

- Web Cache Control Protocol (WCCP)—These WCCP features are supported:
 - WCCP L2 Return
 - WCCP Layer 2 PFC Redirection
 - WCCP Redirection on Inbound Interfaces
 - WCCP Version 1
 - WCCP Version 2
 - See this publication:
<http://www.cisco.com/en/US/docs/ios-xml/ios/ipapp/configuration/12-2sx/iap-wccp.html>



Note

Release 12.2SX does not support these WCCP features:

- WCCP Layer 2 Redirection/Forwarding
- WCCP Mask Assignment
- WCCP VRF Support

Unsupported Features and Commands



Note

See also the [“Supervisor Engine 32 Restrictions”](#) section on page 22 and the [“Cisco IOS Software Modularity Unsupported Features”](#) section on page 8.

- Hardware—See the [“Unsupported Hardware”](#) section on page 112.
- In Release 12.2(33)SXH and later releases:
 - DECNet
 - Route Processor Redundancy Plus (RPR+)
 - Network-based application recognition (NBAR) for LAN interfaces (supported in earlier releases only with Supervisor Engine 2)
- These QoS interface commands are not supported on SPA interfaces:
 - **traffic shape**
 - **priority-group**
 - **custom-queue-list**
 - **tx-queue-limit**
 - **fair-queue**
 - **random-detect**
 - **rate-limit**
 - **tx-ring-limit**
 - **max-reserved-bandwidth**
- These QoS interface commands are not supported on FlexWAN interfaces:
 - **traffic shape**
 - **priority-group**
 - **custom-queue-list**
 - **tx-queue-limit**
- Dot1q Transparency for EoMPLS (supported on OSM ports)
- Metro Ethernet Advanced QinQ Service Mapping (supported on OSM ports)
- Per VLAN load balancing for advanced QinQ service mapping (supported on OSM ports)
- Control Plane DSCP Support for RSVP
- RSVP Scalability Enhancements

- Random Sampled NetFlow (**flow-sampler** commands)
- In releases earlier than Release 12.2(33)SXH, generic routing encapsulation (GRE) tunnel IP source and destination VRF membership (the **tunnel vrf** command). (CSCee39138)
- Warm Reload (CSCef06158)
- ARP Optimization (CSCef30539)
- Exterior Border Gateway Protocol (eBGP) multihop over CSC-PE interfaces (CSCea83165)
- Commands to globally disable EtherChannel or trunking
- **write tech-support** command
- Disable port startup option
- Clear counters per port or clear QoS statistics
- System warning and error counter enhancements implemented in Catalyst software release 6.1(1)
- Command to display the port MAC address
- System warnings on port counters
- VLAN Management Policy Server (VMPS) client or server
- Cisco IOS MAC-layer access control lists (ACLs)
- Cisco IOS firewall feature set (includes context-based access control; CBAC)
- Accelerated server load balancing (ASLB)
- Hot Standby Router Protocol (HSRP) between redundant supervisor engines (the redundant supervisor engine and MSFC are in standby mode—HSRP to external routers is supported)
- Multi-Instance Spanning Tree Protocol (MISTP); IEEE 802.1s MST is supported
- Common Open Policy Server (COPS)
- Except to support tunnels, Resource ReSerVation Protocol (RSVP)
- GARP VLAN Registration Protocol (GVRP)
- GARP Multicast Registration Protocol (GMRP)
- Commands present in the CLI, but not supported:
 - ipv6 cef accounting
 - ip cef accounting
 - module provision

