Release Notes for the Catalyst 4500 Series Switch, Cisco IOS Releases 15.1(1)SG

Current Release
IOS 15.1(1)SG2—November 1, 2012

Previous Release
IOS 15.1(1)SG1 and IOS 15.1(1)SG

These release notes describe the features, modifications, and caveats for Cisco IOS Release 15.1(1)SG on the Catalyst 4500 series switch.

Support for Cisco IOS Software Release 15.1(1)SG, the default image, follows the standard Cisco Systems® support policy, available at
http://www.cisco.com/en/US/products/products_end-of-life_policy.html

Note Although their *Release Notes* are unique, the 4 platforms (Catalyst 4500, Catalyst 4900, Catalyst ME 4900, and Catalyst 4900M/4948E) use the same *Software Configuration Guide*, *Command Reference Guide*, and *System Message Guide*.

For more information on the Catalyst 4500 series switches, visit the following URL:

http://www.cisco.com/go/cat4500/docs

Contents

This publication consists of these sections:

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Cisco IOS Software Packaging

The Enterprise Services image supports all Cisco Catalyst 4500 Series software features based on Cisco IOS Software, including enhanced routing. Customers planning to enable BGP for Supervisor Engine IV, V, or V-10GE will no longer need to purchase a separate BGP license (FR-IRC4) because BGP is included in the Enterprise Services package. Beginning with 12.2(53)SG2, we support the Enterprise Services image on Supervisor Engine 6L-E.

The IP Base image supports Open Shortest Path First (OSPF) for Routed Access, Enhanced Interior Gateway Routing Protocol (EIGRP) "limited" Stub Routing, Nonstop Forwarding/Stateful Switchover (NSF/SSO), and RIPv1/v2. The IP Base image does not support enhanced routing features such as BGP, Intermediate System-to-Intermediate System (IS-IS), Internetwork Packet Exchange (IPX), AppleTalk, Virtual Routing Forwarding (VRF-lite), GLBP, and policy-based routing (PBR).

Cisco IOS Release 12.2(46)SG1 introduced a new LAN Base software and an IP upgrade image. These complement the existing IP Base and Enterprise Services images. The LAN base image is supported on Supervisor Engine 6L-E starting with Cisco IOS Release 12.2(52)XO. LAN Base image is primarily focused on customer access and Layer 2 requirements and therefore many of the IP Base features are not required. The IP upgrade image is available if at a later date you require some of those features.

Starting with Cisco IOS Release 15.0(2)SG, on the Catalyst 4500 Series Switch, support for NEAT feature has been extended from IP Base to LAN Base and support for HSRP v2 IPV6 has been extended from Enterprise Services to IP Base.

Starting with Cisco IOS Release (3.3.0SG or 15.1(1)SG), support for IP SLAs and NSF have been extended from Enterprise Services to IP Base.

Topics include:

Feature Support by Image Type

Table 1 is a detailed list of features supported on Catalyst 4500 Series Switch running Cisco IOS Software Release 15.0(2)SG. For the full list of supported features, check the Feature Navigator application:

http://tools.cisco.com/ITDIT/CFN/

For information on MiBs support, please refer to this URL:

http://ftp.cisco.com/pub/mibs/supportlists/cat4000/cat4000-supportlist.html

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
2-way Community Private VLANs	No	Yes	Yes
8-Way CEF Load Balancing	No	Yes	Yes
10G Uplink Use	Yes	Yes	Yes
AAA Server Group	Yes	Yes	Yes
ACL Logging	Yes	Yes	Yes
All MIBs	Yes	Yes	Yes
ANCP Client	No	Yes	Yes
ANSI TIA-1057 LLDP - MED Location Extension	Yes	Yes	Yes
ANSI TIA-1057 LLDP - MED Support	Yes	Yes	Yes
AppleTalk 1 and 2 (not supported on Sup 6-E and 6L-E)	No	No	Yes
Auto SmartPorts	Yes	Yes	Yes
AutoQoS	Yes	Yes	Yes
Auto-MDIX	Yes	Yes	Yes
Auto-Voice VLAN (part of Auto QoS)	No	Yes	Yes
BGP	No	No	Yes
BGP 4	No	No	Yes
BGP 4 4Byte ASN (CnH)	No	No	Yes
BGP 4 Multipath Support	No	No	Yes
BGP 4 Prefix Filter and In-bound Route Maps	No	No	Yes
BGP Conditional Route Injection	No	No	Yes
BGP Link Bandwidth	No	No	Yes
BGP Neighbor Policy	No	No	Yes
BGP Prefix-Based Outbound Route Filtering	No	No	Yes
BGP Route-Map Continue	No	No	Yes
BGP Route-Map Continue Support for Outbound Policy	No	No	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
BGP Route-Map Policy List Support	No	No	Yes
BGP Soft Reset	No	No	Yes
BGP Wildcard	No	No	Yes
Bidirectional PIM (IPv4 only)	No	Yes	Yes
BOOTP	Yes	Yes	Yes
Bootup GOLD	No	Yes	Yes
Broadcast/Multicast Suppression	Yes	Yes	Yes
Call Home	No	Yes	Yes
CDP/CDPv2	Yes	Yes	Yes
CFM	Yes	Yes	Yes
CGMP - Cisco Group Management Protocol	Yes	Yes	Yes
CiscoView Autonomous Device Manager (ADP)	Yes	Yes	Yes
CNS	Yes	Yes	Yes
Command Scheduler (Kron)	Yes	Yes	Yes
Community PVLAN support	No	Yes	Yes
Config File	Yes	Yes	Yes
Configuration Replace and Configuration Rollback	Yes	Yes	Yes
Configuration Rollback Confirmed Change	No	No	No
Copy Command	Yes	Yes	Yes
Console Access	Yes	Yes	Yes
Control Plane Policing (CoPP)	Yes	Yes	Yes
CoS to DSCP Map	Yes	Yes	Yes
CPU Optimization for Layer 3 Multicast Control Packets	Yes	Yes	Yes
Crashdump Enhancement[1]	Yes	Yes	Yes
DAI (Dynamic ARP Inspection)	Yes	Yes	Yes
DBL (Dynamic Buffer Limiting) - Active Queue Management	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Debug Commands	Yes	Yes	Yes
Device Management	Yes	Yes	Yes
DHCPv6 Relay Agent notification for Prefix Delegation	No	Yes	Yes
DHCP Client	Yes	Yes	Yes
DHCP Server	Yes	Yes	Yes
DHCP Snooping	Yes	Yes	Yes
DHCPv6 Ethernet Remote ID option	No	Yes	Yes
Diagnostics Tools	Yes	Yes	Yes
Digital Optical Monitoring (DOM)	Yes	Yes	Yes
Downloading Software	Yes	Yes	Yes
DSCP to CoS Map	Yes	Yes	Yes
DSCP to egress queue mapping	Yes	Yes	Yes
DSCP/CoS via LLDP	Yes	Yes	Yes
Duplication Location Reporting Issue	No	Yes	Yes
Easy Virtual Network (EVN)	No	No	Yes
EIGRP	No	No	Yes
EIGRP Service Advertisement Framework	Yes	Yes	Yes
EIGRP Stub Routing	No	Yes	Yes
Embedded Event Manager (EEM) 3.2	No	Yes	Yes
Embedded Event Manager and EOT integration	No	Yes	Yes
EnergyWise 2.5	Yes	Yes	Yes
EPoE	Yes	Yes	Yes
EtherChannel	Yes	Yes	Yes
Ethernet Management Port (Fa1 interface)[2]	Yes	Yes	Yes
Ethernet Operations, Administration, and Maintenance (OAM)	Yes	Yes	Yes
Event Log	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Factory Default Settings	Yes	Yes	Yes
FHRP - Enhanced Object Tracking of IP SLAs	Yes	No	Yes
FHRP - GLBP - IP Redundancy API	No	Yes	Yes
FHRP - HSRP - Hot Standby Router Protocol V2	No	Yes	Yes
FHRP - Object Tracking List	No	Yes	Yes
FIPS 140-2/3 Level 2 Certification	Yes	Yes	Yes
File Management	Yes	Yes	Yes
Flex Links+(VLAN Load balancing)	Yes	Yes	Yes
Gateway Load Balancing Protocol (GLBP)	No	Yes	Yes
GOLD Online Diagnostics	Yes	Yes	Yes
HSRP - Hot Standby Router Protocol	No	Yes	Yes
HSRPv2 for IPv6 Global Address Support	No	Yes	Yes
HTTP TACAC+ Accounting support	No	No	No
Identity 4.1 ACL Policy Enhancements	Yes	Yes	Yes
Identity 4.2: MAB with Configurable User Name/Password	Yes	Yes	Yes
Identity 4.1 Network Edge Access Topology	Yes	Yes	Yes
ID 4.0 Voice Vlan assignment	Yes	Yes	Yes
ID 4.1 Filter ID and per use ACL	Yes	Yes	Yes
IEEE 802.1ab LLDP (Link Layer Discovery Protocol)	Yes	Yes	Yes
IEEE 802.1ab LLDP/LLDP-MED	Yes	Yes	Yes
IEEE 802.1ab LLDP enhancements (PoE+Layer 2 COS)	Yes	No	No
IEEE 802.1ag D8.1 standard Compliant CFM, Y.1731 multicast LBM / AIS / RDI / LCK, IP SLA for Ethernet	Yes	Yes	Yes
IEEE 802.1p Support	Yes	Yes	Yes
IEEE 802.1p Prioritization	Yes	Yes	Yes
IEEE 802.1p/802.1q	Yes	Yes	Yes
IEEE 802.1Q Tunneling	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
IEEE 802.1Q VLAN Trunking	Yes	Yes	Yes
IEEE 802.1s Multiple Spanning Tree (MST) Standard Compliance	Yes	Yes	Yes
IEEE 802.1w Spanning Tree Rapid Reconfiguration	Yes	Yes	Yes
IEEE 802.1x (Auth-Fail VLAN, Accounting)	Yes	Yes	Yes
IEEE 802.1x Critical Authorization for Voice and Data	Yes	Yes	Yes
IEEE 802.1x Flexible Authentication	Yes	Yes	Yes
IEEE 802.1x with Multiple authenticated, multi-host	Yes	Yes	Yes
IEEE 802.1x Open Authentication	Yes	Yes	Yes
IEEE 802.1x with User Distribution	Yes	Yes	Yes
IEEE 802.1x User Port Description	Yes	Yes	Yes
IEEE 802.1x VLAN Assignment)	Yes	Yes	Yes
IEEE 802.1x VLAN User Group Distribution	Yes	Yes	Yes
IEEE 802.1x Wake on LAN	Yes	Yes	Yes
IEEE 802.1x Agentless Audit Support	Yes	Yes	Yes
IEEE 802.1x Authenticator	Yes	Yes	Yes
IEEE 802.1x Fallback support	Yes	Yes	Yes
IEEE 802.1x Guest VLAN	Yes	Yes	Yes
IEEE 802.1x MIB Support	Yes	Yes	Yes
IEEE 802.1x Multi-Domain Auth with Voice VLAN Assignment	Yes	Yes	Yes
IEEE 802.1x Multi-Domain Authentication	Yes	Yes	Yes
IEEE 802.1x Private Guest VLAN	Yes	Yes	Yes
IEEE 802.1x Private VLAN Assignment	Yes	Yes	Yes
IEEE 802.1x RADIUS Accounting	Yes	Yes	Yes
IEEE 802.1x Radius-Supplied Session Timeout	Yes	Yes	Yes
IEEE 802.1x and MAB with ACL assignment	Yes	Yes	Yes
IEEE 802.3ad Link Aggregation (LACP)	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
IEEE 802.3ad Link Aggregation (LACP) Port-Channel Standalone Disable	Yes	Yes	Yes
IEEE 802.3ah and CFM Interworking	No	Yes	Yes
IEEE 802.3x Flow Control	Yes	Yes	Yes
IEEE 802.1x Web-Auth	Yes	Yes	Yes
IGMP Filtering	Yes	Yes	Yes
IGMP Querier	Yes	Yes	Yes
IGMP Snooping	Yes	Yes	Yes
IGMP Version 1	Yes	Yes	Yes
IGMP Version 2	Yes	Yes	Yes
IGMP Version 3	Yes	Yes	Yes
IGMPv3 Host Stack	Yes	Yes	Yes
Ingress Policing	Yes	Yes	Yes
Interface Access (Telnet, Console/Serial, Web)	Yes	Yes	Yes
IOS Based Device Profiling	No	Yes	Yes
IP Enhanced IGRP Route Authentication	No	No	Yes
IP Event Dampening	Yes	Yes	Yes
IP Multicast Load Splitting across Equal-Cost Paths	No	Yes	Yes
IP Named Access Control List	Yes	Yes	Yes
IPv6 Tunnels (in software)	Yes	Yes	Yes
IP Routing	Yes	Yes	Yes
IP SLAs DHCP Operation	No	Yes	Yes
IP SLAs Distribution of Statistics	No	Yes	Yes
IP SLAs DNS Operation	No	Yes	Yes
IP SLAs FTP Operation	No	Yes	Yes
IP SLAs History Statistics	No	Yes	Yes
IP SLAs HTTP Operation	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
IP SLAs ICMP Echo Operation	No	Yes	Yes
IP SLAs ICMP Path Echo Operation	No	Yes	Yes
IP SLAs Multi Operation Scheduler	No	Yes	Yes
IP SLAs One Way Measurement	No	Yes	Yes
IP SLAs Path Jitter Operation	No	Yes	Yes
IP SLAs Random Scheduler	No	Yes	Yes
IP SLAs Reaction Threshold	No	Yes	Yes
IP SLAs Responder	Yes	Yes	Yes
IP SLAs Scheduler	No	Yes	Yes
IP SLAs SNMP Support	No	Yes	Yes
IP SLAs Sub-millisecond Accuracy Improvements	No	Yes	Yes
IP SLAs TCP Connect Operation	No	Yes	Yes
IP SLAs UDP Based VoIP Operation	No	Yes	Yes
IP SLAs UDP Echo Operation	No	Yes	Yes
IP SLAs UDP Jitter Operation	No	Yes	Yes
IP SLAs VoIP Threshold Traps	No	Yes	Yes
IPSG (IP Source Guard) v4	Yes	Yes	Yes
IPSG (IP Source Guard) v4 for Static Hosts	Yes	Yes	Yes
IP Unnumbered for VLAN-SVI interfaces	No	Yes	Yes
IPv6 HSRP	No	Yes	Yes
IPv6 Interface Statistics	Yes	Yes	Yes
IPv6 IP SLAs (UDP Jitter, UDP Echo, ICMP Echo, TCP Connect)	No	Yes	Yes
IPv6 (Internet Protocol Version 6)	Yes	Yes	Yes
IPV6 MLD snooping V1 and V2	Yes	Yes	Yes
IPv6 Multicast	No	Yes	Yes
IPv6 Multicast: Bootstrap Router (BSR)	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
IPv6 Multicast: Multicast Listener Discovery (MLD) Protocol, Versions 1 and 2	No	Yes	Yes
IPv6 Multicast: PIM Accept Register	No	Yes	Yes
IPv6 Multicast: PIM Source-Specific Multicast (PIM-SSM)	No	Yes	Yes
IPv6 Multicast: PIM Sparse Mode (PIM-SM)	No	Yes	Yes
IPv6 Multicast: Routable Address Hello Option	No	Yes	Yes
IPv6 Neighbor Discovery	No	Yes	Yes
IPv6 OSPFv3 Fast Convergence	No	Yes[3]	Yes
IPsecv3/IKEv2 (for management traffic only)	Yes	Yes	Yes
IPv6 OSPFv3 NSF/SSO	No	Yes[3]	Yes
Identity 4.1 Network Edge Access Topology	Yes	Yes	Yes
IPv6 RA Guard	Yes	Yes	Yes
IPv6 Reformation	NA	Yes	Yes
IPv6 Router Advertisement (RA) Guard	Yes	Yes	Yes
IPv6 Routing - EIGRP Support	No	No	Yes
IPv6 Routing: OSPF for IPv6 (OSPFv3)	No	Yes[3]	Yes
IPv6 Routing: RIP for IPv6 (RIPng)	No	Yes	Yes
IPv6 Switching: CEFv6 Switched Automatic IPv4-compatible Tunnels (in software)	No	Yes	Yes
IPv6 Switching: CEFv6 Switched Configured IPv6 over IPv4 Tunnels (in software)	No	Yes	Yes
IPv6 Switching: CEFv6 Switched ISATAP Tunnels (in software)	No	Yes	Yes
IPv6 Tunneling: Automatic 6to4 Tunnels (in software)	No	Yes	Yes
IPv6 Tunneling: Automatic IPv4-compatible Tunnels (in software)	No	Yes	Yes
IPv6 Tunneling: IPv6 over IPv4 GRE Tunnels (in software)	No	Yes	Yes
IPv6 Tunneling: ISATAP Tunnel Support (in software)	No	Yes	Yes
IPv6 Tunneling: Manually Configured IPv6 over IPv4 Tunnels (in software)	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
ISIS for IPv4 and IPv6	No	No	Yes
ISL Trunk	Yes	Yes	Yes
ISSU (IOS In-Service Software Upgrade)	No	Yes	Yes
Jumbo Frames	Yes	Yes	Yes
Layer 2 Control Packet	Yes	Yes	Yes
Layer 2 Debug	Yes	Yes	Yes
Layer 2 Protocol Tunneling (L2PT)	No	Yes	Yes
Layer 2 Traceroute	Yes	Yes	Yes
Layer 3 Multicast Routing (PIM SM, SSM, Bidir)	No	Yes	Yes
Link State Tracking	Yes	Yes	Yes
Local Web Auth	Yes	Yes	Yes
MAB (MAC Authentication Bypass) for Voice VLAN	Yes	Yes	Yes
MAC Address Filtering	Yes	Yes	Yes
MAC Based Access List	Yes	Yes	Yes
MAC Move and Replace	Yes	Yes	Yes
Management IPV6 port	Yes	Yes	Yes
Medianet 2.0: AutoQoS SRND4 Macro	No	Yes	Yes
Medianet 2.0: Integrated Video Traffic Simulator (hardware-assisted IP SLA); IPSLA responder only	No	Yes	Yes
Medianet 2.0: Flow Metadata	No	Yes	Yes
Medianet 2.0: Media Service Proxy	No	Yes	Yes
Medianet 2.0: Media Monitoring (Performance Monitoring and Mediatrace)	No	Yes	Yes
Multicast BGP (MBGP)	No	No	Yes
Multicast Routing Monitor (MRM)	No	Yes	Yes
Multicast Source Discovery Protocol (MSDP)	Yes	Yes	Yes
Multi-authentication and VLAN Assignment	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Multi-VRF Support (VRF lite)	No	No	Yes
NAC - L2 IEEE 802.1x	Yes	Yes	Yes
NAC - L2 IP	Yes	Yes	Yes
ND Cache Limit/Interface	No	Yes	Yes
NEAT Enhancement: Re-Enabling BPDU Guard Based on User Configuration	Yes	Yes	Yes
Network Edge Access Topology (NEAT)	Yes	Yes	Yes
Network Time Protocol (NTP)	Yes	Yes	Yes
NMSP Enhancements • GPS support for location • Location at switch level • Local timezone change • Name value pair • Priority settings for MIBs	No	Yes	Yes
Time Protocols (SNTP, TimeP) primary (formerly known as Time Protocols (SNTP, TimeP) master	Yes	Yes	Yes
No. of QoS Filters No. of Security ACE	Yes (4K entries)	Yes	Yes
No Service Password Recovery	Yes	Yes	Yes
No. of VLAN Support	2048	4096	4096
NSF - BGP	No	No	Yes
NSF - EIGRP	No	Yes	Yes
NSF - OSPF (version 2 only)	No	Yes	Yes
NSF/SSO (Nonstop Forwarding with Stateful Switchover)	No	No	Yes
NTP for IPv6	Yes	Yes	Yes
NTP for VRF aware	No	No	Yes
On Demand Routing (ODR)	No	No	Yes
OSPF	No	Yes[3]	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
OSPF v3 Authentication	No	Yes[3]	Yes
OSPF Flooding Reduction	No	Yes[3]	Yes
OSPF for Routed Access	No	Yes	Yes
OSPF Incremental Shortest Path First (i-SPF) Support	No	Yes[3]	Yes
OSPF Link State Database Overload Protection	No	Yes[3]	Yes
OSPF Not-So-Stubby Areas (NSSA)	No	Yes[3]	Yes
OSPF Packet Pacing	No	Yes[3]	Yes
OSPF Shortest Paths First Throttling	No	Yes[3]	Yes
OSPF Stub Router Advertisement	No	Yes[3]	Yes
OSPF Support for Fast Hellos	No	Yes[3]	Yes
OSPF Support for Link State Advertisement (LSA) Throttling	No	Yes[3]	Yes
OSPF Support for Multi-VRF on CE Routers	No	Yes[3]	Yes
OSPF Update Packet-Pacing Configurable Timers	No	Yes[3]	Yes
Out-of-band Management Port	Yes	Yes	Yes
PAgP	Yes	Yes	Yes
Passwords Password clear protection	Yes	Yes	Yes
Per Intf IGMP State Limit	Yes	Yes	Yes
Per Intf MrouteState Limit	Yes	Yes	Yes
Per-User ACL Support for 802.1X/MAB/Webauth users	Yes	Yes	Yes
Per-VLAN Learning	Yes	Yes	Yes
PIM Sparse Mode Version4	No	No	Yes
PIM Version 1	No	Yes	Yes
PM Version 2	No	Yes	Yes
PoE (up to 15.4W only)	Yes	Yes	Yes
PoE+ Ready	Yes	Yes	Yes
PoEP via LLDP	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Policy-Based Routing (PBR)	No	No	Yes
Port Access Control List (PACL)	Yes	Yes	Yes
Port Monitoring (interface Stats)	Yes	Yes	Yes
Port Security	Yes	Yes; only 1024 MACs	Yes
Post Status	Yes	Yes	Yes
Pragmatic General Multicast (PGM)	Yes	Yes	Yes
Private VLANs	Yes	Yes	Yes
Propagation of Location Info over CDP	Yes	Yes	Yes
PVLAN over EtherChannel	Yes	Yes	Yes
PVST+ (Per Vlan Spanning Tree Plus)	Yes	Yes	Yes
Q-in-Q	No	Yes	Yes
RACL (DSCP based)	Yes	Yes	Yes
RADIUS/TACACS+ (AAA)	Yes	Yes	Yes
RADIUS Attribute 44 (Accounting Session ID) in Access Requests	Yes	Yes	Yes
RADIUS Change of Authorization	Yes	Yes	Yes
Rapid-Per-VLAN-Spanning Tree (Rapid-PVST)	Yes	Yes	Yes
Remote SPAN (RSPAN)	Yes	Yes	Yes
REP (Resilient Ethernet Protocol)	Yes	Yes	Yes
REP - No Edge Neighbour Enhancement	Yes	Yes	Yes
RIP v1	No	Yes	Yes
RMON	Yes	Yes	Yes
Role-Based Access Control CLI commands (RBAC)	Yes	Yes	Yes
RPR	Yes	Yes	Yes
RPVST+	Yes	Yes	Yes
RSPAN	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Secure Copy (SCP)	Yes	Yes	Yes
Secure Shell SSH Version 1, 2 Server Support	Yes	Yes	Yes
Secure Shell SSH Version 1, 2 Client Support	Yes	Yes	Yes
Service Advertisement Framework (SAF)	No	No	Yes
SmartPorts (Role based MACRO)	Yes	Yes	Yes
SNMP (Simple Network Management Protocol)	Yes	Yes	Yes
SNMPv3 (SNMP Version 3)	Yes	Yes	Yes
Source Port Filtering (Private VLAN)	Yes	Yes	Yes
Source Specific Multicast (SSM)	No	Yes	Yes
Source Specific Multicast (SSM) - IGMPv3,IGMP v3lite, and URD	Yes	Yes	Yes
Source Specific Multicast (SSM) Mapping	Yes	Yes	Yes
SPAN (# of sessions) – Port Mirroring	Yes (2 sessions)	Yes (8 bidirectional sessions)	Yes
SSHv2/Secure Copy, FTP, SSL, Syslog, Sys Information	Yes	Yes	Yes
SSO (Stateful SwitchOver)	No	Yes	Yes
Static Routing (IPv4/IPv6)	Yes	Yes	Yes
Storm Control - Per-Port Multicast Suppressio	Yes	Yes	Yes
Stub IP Multicast Routing	No	Yes	No
Sub-second UDLD	Yes	Yes	Yes
SVI (Switch Virtual Interface) Autostate Exclude	Yes	Yes	Yes
TACACS+	Yes	Yes	Yes
TACACS+ and Radius for IPv6-	Yes	Yes	Yes
Time-Based Access Lists	Yes	Yes	Yes
Time Domain Reflectometry (TDR)[4]	No	Yes	Yes
Time Protocols (SNTP, TimeP)	Yes	Yes	Yes
Traffic Mirroring (SPAN)	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on the Catalyst 4500 Series Switch

Feature	LAN Base	IP Base	Enterprise Services
Trusted Boundary (LLDP & CDP Based)	Yes	Yes	Yes
TrustSec: IEEE 802.1ae MACSec Layer 2 encryption	No	Yes	Yes
TrustSec: IEEE 802.1ae MACSec encryption on user facing ports	No	Yes	Yes
TrustSec: IEEE 802.1ae MACSec encryption on user facing ports SSO	No	Yes	Yes
TrustSec: IEEE 802.1ae MACSec encryption between switch-to-switch links using Cisco SAP (Security Association Protocol)	No	Yes	Yes
Unicast Reverse Path Forwarding (uRPF)	Yes	Yes	Yes
UniDirectional Link Detection (UDLD)	Yes	Yes	Yes
Virtual Router Redundancy Protocol (VRRP)	No	Yes	Yes
VLAN Access Control List (VACL)	Yes	Yes	Yes
VLAN Mapping (VLAN Translation)	No	Yes	Yes
Voice VLAN	Yes	Yes	Yes
VRF-aware TACACS+	No	No	Yes
VTP (Virtual Trunking Protocol) Version 2	Yes	Yes	Yes
VTP version 3	Yes	Yes	Yes
WCCP Redirection on Inbound Interfaces	No	Yes	Yes
WCCP Version 2	No	Yes	Yes
XML-PI	Yes	Yes	Yes

1. Supported only on Supervisor Engine 6-E and Supervisor Engine 6L-
2. Starting with Cisco IOS Release 12.2(46)SG
3. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 1000 dynamically learned routes.
4. TDR is not supported on 46xx linecards.

Note You can purchase a special license to enable the 10 Gigabit uplinks in the LAN Base image without moving to IP Base.

Features Not Supported on the Cisco Catalyst 4500 Series Switch

The following features are not supported in Cisco IOS Release 15.1(1)SG on the Catalyst 4500 series switches:

- The following ACL types:
  - Standard Xerox Network System (XNS) access list
  - Extended XNS access list
  - DECnet access list
  - Protocol type-code access list
- ADSL and Dial access for IPv6
- AppleTalk EIGRP (use native AppleTalk routing instead)
- Bridge groups
- CEF Accounting
- Cisco IOS software IPX ACLs:
  - <1200-1299>	IPX summary address access list
- Cisco IOS software-based transparent bridging (also called "fallback bridging")
- Connectionless (CLNS) routing; including IS-IS routing for CLNS. IS-IS is supported for IP routing only.
- DLSw (data-link switching)
- IGRP (use EIGRP instead)
- **isis network point-to-point** command
- Kerberos support for access control
- LLDP HA
- Lock and key
- NAT-PT for IPv6
- NetFlow per-VRF
- PBR with Multiple Tracking Options
- QoS for IPv6 traffic (only supported on Supervisor 6)
- Reflexive ACLs
- Routing IPv6 over an MPLS network
- WCCP version 1
- CFM CoS
- PBR with EOT

Orderable Product Numbers

Table 2 Orderable Product Numbers for the Catalyst 4500 Series Switch

Product Number	Description	Image
S45EIPB- 15101SG (=)	Cisco IOS Software for the Cisco Catalyst 4500 Supervisor Engine 6-E and Sup6L-E (IP Base image)	Cat4500e-ipbase-mz
S45EIPBK9-15101SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E and Sup6L-E (IP Base image with 3DES)	Cat4500e-ipbasek9-mz
S45EES-15101SG (=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E and Sup6L-E (Enterprise Services image)	Cat4500e-entservices-mz
S45EESK9-15002SG(=)	Cisco IOS Software for the Cisco Catalyst 4500 Series Supervisor Engine 6-E and Sup6L-E (Enterprise Services image with 3DES)	Cat4500e-entservicesk9-mz
S45EESU-15002SG(=)	Cisco IOS Enterprise image upgrade from LAN Base for the Supervisor 6-E and Supervisor 6L-E	Cat4500e-entservices-mz
S45EESUK915002SG(=)	Cisco IOS Enterprise with 3DES upgrade from LAN Base for the supervisor 6-E and Supervisor 6L-E	Cat4500e-entservicesk9-mz
S45EIPBU-15002SG(=)	Cisco IOS Software for the Catalyst 4500 Series Supervisor Engine 6-E and Sup6L-E IOS IP Base Upgrade	Cat4500e-ipbase-mz
S45EIBUK9-15002SG(=)	Cisco IOS Software for the Catalyst 4500 Series Supervisor Engine 6-E and Sup6L-E IOS IP Base Upgrade SSH	Cat4500e-ipbasek9-mz

Cisco Classic IOS Release Strategy

Customers using Supervisor Engine 6-E or 6L-E with Catalyst 4500 Series Switches who need the latest hardware and software features should migrate to Cisco IOS Release 15.1(1)SG.

Note This release does not support older Supervisor Engines, including II+, III, IV, V, and V-10GE.

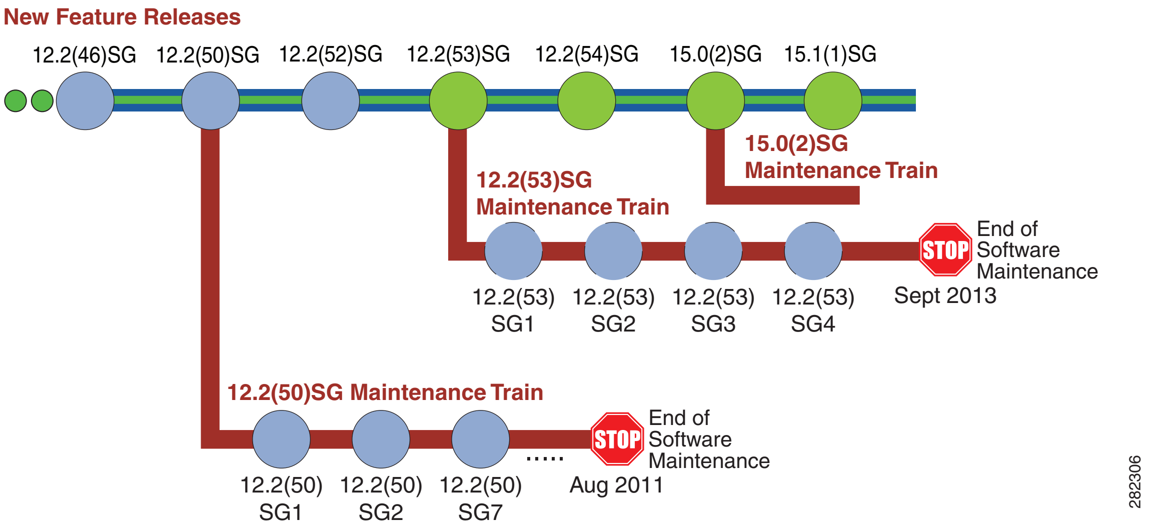
The Catalyst 4500 Series Switch has two maintenance trains. Cisco IOS Release 15.0(2)SG is the recommended release for customers who require a release with a maintenance train.

For more information on the Catalyst 4500 series switches, visit the following URL:

http://www.cisco.com/go/cat4500/docs

Figure 1 displays the two active trains, 12.2(53)SG and 15.0(2)SG.

Figure 1 Software Release Strategy for the Catalyst 4500 Series Switch



Support

Support for Cisco IOS Software Release 15.1(1)SG follows the standard Cisco Systems® support policy, available at
http://www.cisco.com/en/US/products/products_end-of-life_policy.html

System Requirements

This section describes the system requirements:

- Supported Hardware on Catalyst 4500 Series Switch, page 19
- Supported Hardware on Catalyst 4500 E-Series Switch, page 23

Supported Hardware on Catalyst 4500 Series Switch

Table 3 lists the hardware supported on the Catalyst 4500 Series Switch.

Table 3 Supported Hardware

Product Number (append with "=" for spares)	**Product Description**	**Software Release**
		Minimum
Supervisor Engines		
WS-X45-Sup6-E	Catalyst 4500 E-series switch Supervisor Engine 6-E **Note** This engine is supported on legacy and E-series chassis.	12.2(40)SG

Table 3 Supported Hardware (continued)

Product Number (append with "=" for spares)	**Product Description**	**Software Release**
		Minimum
WS-X45-Sup6L-E	Catalyst 4500 E-series switch Supervisor Engine 6L-E **Note** This engine is supported on legacy and E-series 3,6, and 7 slot chassis.	12.2(52)XO
Gigabit Ethernet Switching Modules		
WS-X4302-GB	2-port 1000BASE-X (GBIC) Gigabit Ethernet module	12.1(19)EW
WS-X4306-GB	6-port 1000BASE-X (GBIC) Gigabit Ethernet switching module	12.1(8a)EW
WS-X4418-GB	18-port 1000BASE-X (GBIC) Gigabit Ethernet server switching module	12.1(8a)EW
WS-X4412-2GB-T	12-port 1000BASE-T Gigabit Ethernet and 2-GBIC ports switching module	12.1(8a)EW
WS-X4424-GB-RJ45	24-port 10/100/1000BASE-T Gigabit Ethernet RJ-45 switching module	12.1(8a)EW
WS-X4448-GB-LX	48-port 1000BASE-LX (small form-factor pluggable) Gigabit Ethernet fiber optic interface switching module	12.1(8a)EW
WS-X4448-GB-RJ45	48-port 10/100/1000BASE-T Gigabit Ethernet switching module	12.1(8a)EW
WS-X4448-GB-SFP	48-port 1000BASE-X (small form-factor pluggable) module	12.2(20)EW
WS-X4506-GB-T	6-port Alternately-Wired 10/100/1000BASE-T Catalyst 4500 series Power over Ethernet (PoE) 802.3af or 1000BASE-X SFP	12.2(20)EWA
WS-X4524-GB-RJ45V	24-port 10/100/1000BASE-T RJ-45 Catalyst 4500 series PoE 802.3af	12.2(18)EW
WS-X4548-GB-RJ45	48-port 10/100/1000BASE-T Gigabit Ethernet module	12.1(19)EW
WS-X4548-GB-RJ45V	48-port 10/100/1000BASE-T RJ-45 Catalyst 4500 series PoE 802.3af	12.2(18)EW
WS-X4548-RJ45V+	48-port 10/100/1000 Premium PoE line card	12.2(50)SG
WS-X4624-SFP-E	Non-blocking 24-port 1000BASEX (small form factor pluggable) module	12.2(44)SG
WS-X4640-CSFP-E	80 ports with Gigabit compact SFP (4:1 oversubscribed); 40 modules of Gigabit SFP line card (1000BaseX), providing 24 gigabits per-slot capacity (SFP optional) (2:1 oversubscribed) **Note** WS-X4640-CSFP-E is not supported in a 10-slot chassis.	15.1(1)SG
WS-X4648-RJ45V-E	48 port 10/100/1000 Mb with 2 to 1 oversubscription	12.2(40)SG
WS-X4648-RJ45V+E	48 port 10/100/1000 Mb with 2 to 1 oversubscription	12.2(40)SG
Fast Ethernet Switching Modules		
WS-X4124-FX-MT	24-port 100BASE-FX Fast Ethernet MT-RJ multimode fiber switching module	12.1(8a)EW
WS-X4148-FX-MT	48-port 100BASE-FX Fast Ethernet MT-RJ multimode fiber switching module	12.1(8a)EW
WS-X4148-FE-LX-MT	48-port 100BASE-LX10 Fast Ethernet MT-RJ single-mode fiber switching module	12.1(13)EW
WS-X4148-FE-BD-LC	48-port 100BASE-BX10-D module	12.2(18)EW
WS-X4248-FE-SFP	48-port 100BASE-X SFP switching module	12.2(25)SG
WS-U4504-FX-MT	4-port 100BASE-FX (MT-RF) uplink daughter card	12.1(8a)EW
Ethernet/Fast Ethernet (10/100) Switching Modules		

Table 3 Supported Hardware (continued)

Product Number (append with "=" for spares)	**Product Description**	**Software Release**
		Minimum
WS-X4124-RJ45	24-port 10/100 RJ-45 module	12.2(20)EW
WS-X4148-RJ	48-port 10/100 RJ-45 switching module	12.1(8a)EW
WS-X4148-RJ21	48-port 10/100 4xRJ-21 (telco connector) switching module	12.1(8a)EW
WS-X4148-RJ45V	48-port Pre-standard PoE 10/100BASE-T switching module	12.1(8a)EW for data support 12.1(11b)EW for data and inline power support
WS-X4224-RJ45V	24-port 10/100BASE-TX RJ-45 Cisco Catalyst 4500 series PoE 802.3af	12.2(20)EW
WS-X4232-GB-RJ	32-port 10/100 Fast Ethernet RJ-45, plus 2-port 1000BASE-X (GBIC) Gigabit Ethernet switching module	12.1(8a)EW
WS-X4248-RJ45V	48-port 10/100BASE-T RJ-45 Cisco Catalyst 4500 series PoE 802.3af	12.2(18)EW
WS-X4248-RJ21V	48-port 10/100 Fast Ethernet RJ-21 Cisco Catalyst 4500 series PoE 802.3af telco	12.2(18)EW
WS-X4232-RJ-XX	32-port 10/100 Fast Ethernet RJ-45 modular uplink switching module	12.1(8a)EW
Other Modules		
MEM-C4K-FLD64M	Catalyst 4500 series switch CompactFlash, 64 MB Option	12.1(8a)EW
MEM-C4K-FLD128M	Catalyst 4500 series switch CompactFlash, 128 MB Option	12.1(8a)EW
WS-F4531	Catalyst 4500 series switch NetFlow Services Card on Catalyst 4500 series switch Supervisor Engines IV and V	12.1(13)EW
WS-X4590=	Catalyst 4500 series switch Fabric Redundancy Modules	12.2(18)EW
PWR-C45-1000AC	Catalyst 4500 series switch 1000 Watt AC power supply for chassis 4503, 4506, and 4507R (data only)	12.1(12c)EW
PWR-C45-1400DC	Catalyst 4500 series switch 1400 Watt DC triple input power supply (data-only)	12.2(25)EW
PWR-C45-1400DC-P	Catalyst 4500 series switch 1400 Watt DC power supply with integrated PEM	12.1(19)EW
PWR-C45-1400AC	Catalyst 4500 series switch 1400 Watt AC power supply (data-only)	12.1(12c)EW
PWR-C45-1300ACV	Catalyst 4500 series switch 1300 Watt AC power supply with integrated voice for chassis 4503, 4506, and 4507R	12.1(12c)EW
PWR-C45-2800ACV	Catalyst 4500 series switch 2800 Watt AC power supply with integrated voice (data and PoE) for chassis 4503, 4506, and 4507R	12.1(12c)EW
PWR-C45-4200ACV	Catalyst 4500 series switch 4200 Watt AC dual input power supply with integrated voice (data and PoE)	12.2(25)EWA5
WS-P4502-1PSU	Catalyst 4500 series switch auxiliary power shelf (25-slot), including one PWR-4502	12.1(19)EW
PWR-4502	Catalyst 4500 series switch auxiliary power shelf redundant power supply	12.1(19)EW
PWR-C45-6000ACV	Catalyst 4500 Series Switch 6000 W AC power supply	12.2(53)SG

For Catalyst 4500 transciever module compatibility information, see the URL:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Table 3 briefly describes the four chassis in the Catalyst 4500 Series Switch. For the chassis listed in the table, refer to Table 6 on page 24 for software release information.

Chassis Description for the Catalyst 4500 Series Switch

Product Number (append with "=" for spares)	**Description of Modular Chassis**
WS-C4503	Catalyst 4503 chassis includes these components: • 3 slots • Fan tray
WS-C4506	Catalyst 4506 chassis includes these components: • 6 slots • Fan tray
WS-C4507R	Catalyst 4507R chassis includes these components: • 7 slots • Fan tray
WS-C4510R	Catalyst 4510R chassis includes these components: • 10 slots; slot 10 accepts only the Catalyst 4500 series 2-port Gigabit Ethernet line card • Fan tray

For information on the minimum supported release for each pluggable module please refer to:

http://www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html

Table 4 DOM Support on the Catalyst 4500 Series Switch applies to these module

Transceiver Module
CWDM- SFP-*xx*
DWDM-GBIC-*xx*
DWDM-SFP
DWDM-X2-*xx*
GLC-BX-D
GLC-BX-U
GLC-LH-SMD
GLC-EX-SMD
GLC-FE-100EX
GLC-FE-100ZX
GLC-FE-100FX
SFP-10G-SR

Table 4 DOM Support on the Catalyst 4500 Series Switch applies to these module

Transceiver Module
SFP-10G-LR
SFP-10G-LRM
SFP-10G-ER
SFP-10G-ZR

Supported Hardware on Catalyst 4500 E-Series Switch

In addition to the classic line cards and supervisor engines, Cisco IOS Software Release 15.0(2)SG supports the next-generation high-performance E-Series Supervisor Engine 6-E with CenterFlex technology and E-Series line cards and chassis. A brief list of primary E-Series hardware supported on Catalyst 4500 series switch (Table 5).

Table 5 Supported E-Series Hardware

Product Number	Description
WS-C4503-E	Cisco Catalyst 4500 E-Series 3-Slot Chassis • Fan tray • No Power Supply
WS-C4506-E	Cisco Catalyst 4500 E-Series 6-Slot Chassis • Fan tray • No Power Supply
WS-C4507R-E	Cisco Catalyst 4500 E-Series 7-Slot Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability
WS-C4507R+E	Cisco Catalyst 4500 E-Series 7-Slot 48 GB-ready Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability
WS-C4510R-E	Cisco Catalyst 4500 E-Series 10-Slot Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • Slots 8, 9, and 10 are limited to 6Gbps when used with a Supervisor Engine 6-E or a Supervisor Engine 6L-E.

Table 5 Supported E-Series Hardware

Product Number	Description
WS-C4510R+E	Cisco Catalyst 4500 E-Series 10-Slot 48 GB-ready Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • You cannot place a linecard with a backplane traffic capacity exceeding 6Gbps in slots 8, 9 and 10 of a Catalyst 4510R+E chassis when used with a Supervisor Engine 6-E or a Supervisor Engine 6L-E.
WS-X45-Sup6-E	Cisco Catalyst 4500 E-Series Sup 6-E, 2x10GE(X2) w/ TwinGig
WS-X45-Sup6L-E	Cisco Catalyst 4500 E-Series Sup 6L-E
WS-X4624-SFP-E	Cisco Catalyst 4500 E-series 24-Port 1000BaseX (small form factor pluggable) module
WS-X4648-RJ45V-E	Cisco Catalyst 4500 E-Series 48-Port PoE 802.3af 10/100/1000(RJ45)
WS-X4648-RJ45V+E	Cisco Catalyst 4500 E-Series 48-Port Premium PoE 10/100/1000
WS-X4606-X2-E	Cisco Catalyst 4500 E-Series 6-Port 10GbE (X2) w/ TwinGig
WS-X4648-RJ45-E	Cisco Catalyst 4500 E-Series 48-Port 10/100/1000(RJ45)

Table 6 outlines the chassis and supervisor engine compatibility.
(M=Minimum release, R=Recommended release)

Table 6 Chassis and Supervisor Compatiblity

Chassis	Sup 6-E	Sup 6L-E
WS-C4503-E	M: 12.2(40)SG	M: 12.2(52)XO
WS-C4506-E	M: 12.2(40)SG	M: 12.2(52)XO
WS-C4507R-E	M: 12.2(40)SG	M: 12.2(52)XO
WS-C4507R+E	M: 12.2(54)SG	M: 12.2(54)SG
WS-C4510R-E	M: 12.2(40)SG	
WS-C4510R+E	M: 12.2(54)SG	

New and Changed Information

These sections describe the new and changed information for the Catalyst 4500 series switch running Cisco IOS software:

- New Hardware Features in Release 15.1(1)SG1, page 25
- New Software Features in Release 15.1(1)SG1, page 25
- New Hardware Features in Release 15.1(1)SG, page 25
- New Software Features in Release 15.1(1)SG, page 25

New Hardware Features in Release 15.1(1)SG1

Release 15.1(1)SG1 provides no new hardware on the Catalyst 4500 series switch.

New Software Features in Release 15.1(1)SG1

Release 15.1(1)SG1 provides no new new software on the Catalyst 4500 series switch:

New Hardware Features in Release 15.1(1)SG

Release 15.1(1)SG provides the following new hardware on the Catalyst 4500 series switch:

- GLC-FE-100EX and GLC-FE-100ZX for Fast Ethernet SFP ports on WS-X4248-FE-SFP
- GLC-GE-100FX for Gigabit Ethernet SFP ports on WS-X4640-CSFP-E, WS-X4612-SFP-E and WS-X4624-SFP-E

Note Although GLC-GE-100FX plugs in Gigabit Ethernet SFP port, it provides 100M bandwidth

- GLC-EX-SMD for all Gigabit Ethernet SFP ports
- WS-X4640-CSFP-E

New Software Features in Release 15.1(1)SG

Release 15.1(1)SG provides the following new software features on the Catalyst 4500 series switch.

- IOS Based Device profiling
- SXP Syslog enhancement
- Medianet 2.0
  - Monitoring (includes Performance Monitoring and Mediatrace)
  - Flow Metadata
  - Media Services Proxy
  - Integrated video traffic simulator (hardware assisted IP SLA)

    IPSLA responder only
  - AutoQoS Macro
- Medianet2.0:NMSP enhancements
  - Location at switch level
  - Local timezone change
  - GPS support for location
  - Priority settings for MIBs
  - Name value pair
- EnergyWise Version 2.5

For details refer to the URLs:

http://www.cisco.com/en/US/docs/net_mgmt/cisco_configuration_professional/v2_5/olh/ccp.pdf

http://www.cisco.com/en/US/docs/switches/lan/energywise/phase2_5/ios/release/notes/ol23554.html

- IPv6 OSPFv3 NSF/SSO
- IPv6 OSPFv3 Fast Convergence
- OSPFv3 Authentication
- IPsecv3/IKEv2 (for management traffic only)
- FIPS 140-2/3 Level 2 Certification
- No Service Password Recovery
- Easy Virtual Network (EVN)
- ND cache limit per interface
- HSRPv2 for IPv6 Global Address Support
- Identity 4.2: MAB with configurable user name/ password
- BGP Wildcard
- BGP 4Byte ASN (CnH)
- BGP graceful restart per neighbor
- BGP Nexthop tracking
- Dynamic PBR API
- Multicast Call Admission Control—Per interface route state limit
- Bandwidth-based Call Admission Control policy for Multicast
- Ability to disallow mcast group ranges
- IPv6 SSM mapping—MLD v1 receivers
- IPv6 BSR—Ability to configure RP mapping
- MSDP MD5 password authentication
- MLD group limits
- IPv6 multicast—Disable group ranges
- IGMP static group range support
- PIM-triggered joins
- Support directly conn. add in autoRP cand. RP
- Enhanced Multicast Multipath
- IGMP-STD-MIB implementation
- Knob to use SNMP MIBII ifindex as int-id in OSPF data fields
- Enhanced OSPF traffic stats
- OSPF Mechanism to exclude Connected prefixes
- OSPF TTL Security Check
- OSPF Graceful Shutdown
- OSPFv2 int. enabling—OSPF area command
- OSPFv3 IPSec enhancements

- IP-RIP: Delayed startup
- AAA accounting: Stop record CLI enhancement
- Radius Server Load Balancing porting
- AAA Double Authentication Secured by Absolute Timeout
- Local AAA Attribute Support via Subscriber Profile
- Method List, Server Group Scalability
- BGP: Dual AS Accept Implementation
- NSF in IP Base
- IGMPv3 Host Stac
- Per Intf IGMP State Limit
- Per Intf MrouteState Limit
- TACACS+ and Radius for IPv6
- NTP for IPv6(It is VRF aware as well)

Upgrading the System Software

In most cases, upgrading the switch to a newer release of Cisco IOS software does not require a ROMMON upgrade. However, if you are running an early release of Cisco IOS software and plan to upgrade, refer to the following tables for the minimum Cisco IOS image and the recommended ROMMON release, respectively.

Note You must upgrade to at leaset ROMMON Release 12.2(44r)SG5 to run Cisco IOS Release 15.0(2)SG on the Supervisor Engine 6-E and Supervisor Engine 6L-E. 12.2(44r)SG9 is recommended.

Caution Most supervisor engines have the required ROMMON release. However, due to caveat CSCed25996, we recommend that you upgrade your ROMMON to the recommended release.

Table 7 Supervisor Engine and Recommended ROMMON Release

Supervisor Engine	Recommended ROMMON Release
6-E	12.2(44r)SG9
6L-E	12.2(44r)SG9

Table 8 ROMMON Release and Promupgrade Programs

ROMMON Release	Promupgrade Program
12.2(31r)SGA4	cat4500-e-ios-promupgrade-122_31r_SGA4
12.2(44r)SG5	cat4500-e-ios-promupgrade-122_44r_SG5

Table 8 ROMMON Release and Promupgrade Programs

ROMMON Release	Promupgrade Program
12.2(44r)SG9	cat4500-e-ios-promupgrade-122_44r_SG9
12.2(44r)SG10	cat4500-e-ios-promupgrade-122_44r_SG10

The following sections describe how to upgrade your switch software:

- Identifying an +E Chassis and ROMMON, page 28
- Guidelines for Upgrading the ROMMON, page 28
- Upgrading the Supervisor Engine ROMMON from the Console, page 29
- Upgrading the Supervisor Engine ROMMON Remotely Using Telnet, page 32
- Upgrading the Cisco IOS Software, page 36

Identifying an +E Chassis and ROMMON

An +E chassis is identified by a FRU minor value in the chassis' idprom.

When supervisor engine 1 (sup1) is in ROMMON and supervisor engine 2 (sup2) is in IOS, only sup2 can read the idprom contents of chassis' idprom. Chassis type is displayed as "+E" in the output of the **show version** command. Conversely, sup1 can only display the chassis type as "E."

When both sup1 and sup2 are in ROMMON, both engines can read the chassis' idprom. Chassis type is displayed correctly as "+E" in the output of the **show version** command.

When both sup1 and sup2 are in IOS, both engines can read the chassis' idprom. Chassis type is displayed correctly as "+E" in the output of the **show version** command.

Guidelines for Upgrading the ROMMON

Caution If your supervisor engine is shipped with a newer version of ROMMON then do not downgrade! The new ROMMON will have board settings based on a hardware revision of components, and old settings will not work.

Caution Upgrading ROMMON on Supervisor Engine 6-E and 6L-E may reset their uplink interfaces. Software prior to Cisco IOS Release 15.0(2)SG did not detect and recover from this situation when the standby supervisor engine ROMMON is upgraded. The redundant supervisor engine ROMMON upgrade process described next only works when the active supervisor engine is running Cisco IOS Release 15.0(2)SG. For redundant systems, you first upgrade the software to Cisco IOS Release 15.0(2)SG, then upgrade the ROMMON.

Upgrading the Supervisor Engine ROMMON from the Console

Caution To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

Note The examples in this section use the programmable read-only memory (PROM) upgrade version 12.2(44r)SG9 and Cisco IOS Release 12.2(50)SG. For other software releases, replace the ROMMON release and Cisco IOS software release with the appropriate release and filename. This document describes the procedure for a single supervisor engine system. In a dual supervisor engine system, you must perform the process on each supervisor engine.

Follow this procedure to upgrade your supervisor engine ROMMON:

Step 1 Directly connect a serial cable to the console port of the supervisor engine.

Note This section assumes that the console baud rate is set to 9600 (default). If you want to use a different baud rate, change the configuration register value for your switch.

Step 2 Download the cat4500-e-ios-promupgrade-122_44r_SG9 program from Cisco.com, and place it on a TFTP server in a directory that is accessible from the switch to be upgraded.

The cat4500-e-ios-promupgrade-122_44r_SG9 program is available on Cisco.com at the same location from which Catalyst 4500 system images are downloaded.

Step 3 Use the **dir bootflash:** command to ensure that sufficient space exists in Flash memory to store the PROM upgrade image. If you are using a CompactFlash card, replace **bootflash:** with **slot0:**

Note Because of CSCsu36751, you should use bootflash for this upgrade if your current ROMMON version is prior to 12.2(44r)SG3. Else, you might need to reseat the compact flash after rebooting.

Step 4 Download the cat4500-e-ios-promupgrade-122_44r_SG9 program into Flash memory using the **copy tftp** command.

The following example shows how to download the PROM upgrade image cat4500-e-ios-promupgrade-122_44r_SG9 from the remote host 172.20.58.78 to bootflash:

```
Switch# copy tftp: bootflash:
Address or name of remote host [172.20.58.78]?
Source filename [cat4500-e-ios-promupgrade-122_44r_SG9]?
Destination filename [cat4500-e-ios-promupgrade-122_44r_SG9]?
Accessing tftp://172.20.58.78/cat4500-e-ios-promupgrade-122_44r_SG9...
Loading cat4500-e-ios-promupgrade-122_44r_SG9 from 172.20.58.78 (via
FastEthernet2/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!
[OK - 2404172 bytes]

2404172 bytes copied in 28.536 secs (84250 bytes/sec)
Switch#
```

Step 5 On a dual-supervisor system, copy the same ROMMON image to the standby supervisor engine with the **copy bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 slavebootflash** command

Step 6 Enter the **reload** command to reset the switch, press **Ctrl-C** to stop the boot process, and re-enter ROMMON.

Note On a redundant system, this action causes a switchover.

The following example shows the output after a reset into ROMMON:

```
Switch# reload
Proceed with reload? [confirm]

03:57:16:%SYS-5-RELOAD:Reload requested ?


 Rom Monitor Program Version 12.2(44r)SG3


.
.(output truncated)
.

 Established physical link 1Gb Full Duplex
 Network layer connectivity may take a few seconds
rommon 1 >
```

Step 7 Run the PROM upgrade program by entering this command:
boot bootflash:cat4500-e-ios-promupgrade-122_44r_SG9

Caution No intervention is necessary to complete the upgrade. To ensure a successful upgrade, do not interrupt the process. Do not perform a reset, power cycle, or OIR of the supervisor engine until the upgrade completes.

The following example shows the output from a successful upgrade, followed by a system reset:

```
rommon 2 > boot bootflash:cat4500-e-ios-promupgrade-122_44r_SG9

Image Name : Cat4K_Mpc8548_Rommon
 Image size : 1048576 bytes

 Uncompressing image.....
 Done!

 *********************************************************
 *        ** Now Upgrading Primary ROMMON Image **        *
 *********************************************************

 Offset: 7E00000
erasing... writing... reading... verifying...  Done!


 *********************************************************
 *            ** Now Programming FPGA Image **            *
 *********************************************************

 Image Name : Cat4K_JAWA_Fpga
 Image size : 524288 bytes
 Uncompressing image.....
 Done!

Device ID 12, status  0, size 524288 bytes, we have 524288 bytes
erasing... writing/verifying sectors... 0 1 2 3 4 5 6 7 Done!
 **********************************************************
 System will now reset itself and reboot within few seconds
 **********************************************************
*!*

 **********************************************************
 *                                                        *
 * Welcome to Rom Monitor for WS-X45-SUP6-E System.       *
 * Copyright (c) 2003-2010 by Cisco Systems, Inc.         *
 * All rights reserved.                                   *
 *                                                        *
 **********************************************************
….
Rom Monitor Program Version 12.2(44r)SG9
 CPU Rev: 2.0, Board Rev: 4, Board Type: 10, CPLD Jawa Rev: 20
…
rommon 1>
```

Step 8 Boot the Cisco IOS software image. This may happen automatically if the system is configured to auto-boot.

Step 9 On a redundant system, hook up a console to the now-active supervisor engine. After the system achieves an SSO state, repeat steps 6-8.

Step 10 Use the **show module** command to verify that you have upgraded the ROMMON:

```
Switch# show module
Chassis Type : WS-C4510R-E

Power consumed by backplane : 40 Watts

Mod Ports Card Type                              Model              Serial No.
---+-----+--------------------------------------+------------------+-----------
 3    48  10/100/1000BaseT POE E Series          WS-X4648-RJ45V-E   JAE1129QL9N
 4    48  10/100/1000BaseT Premium POE E Series  WS-X4648-RJ45V+E   JAE1129QSAV
 5     6  Sup 6-E 10GE (X2), 1000BaseX (SFP)     WS-X45-SUP6-E      JAE1225MJMN
 6     6  Sup 6-E 10GE (X2), 1000BaseX (SFP)     WS-X45-SUP6-E      JAE1224LAOS
 7    48  10/100/1000BaseT (RJ45)V, Cisco/IEEE   WS-X4548-RJ45V+    JAB1229BCMD
 8    24  10/100/1000BaseT (RJ45)V, Cisco/IEEE   WS-X4524-GB-RJ45V  JAB0815059Q

M MAC addresses                    Hw  Fw           Sw               Status
--+--------------------------------+---+------------+----------------+---------
 3 001c.58f8.2240 to 001c.58f8.226f 0.3                               Ok
 4 001c.58f8.2090 to 001c.58f8.20bf 0.3                               Ok
 5 0017.94c9.85c0 to 0017.94c9.85c5 1.1 12.2(44r)SG9  12.2(50)SG      Ok
 6 0017.94c9.85c6 to 0017.94c9.85cb 1.1 12.2(44r)SG9  12.2(50)SG      Ok
 7 000a.8aff.3830 to 000a.8aff.385f 0.1                               Ok
 8 0030.850e.3e78 to 0030.850e.3e8f 0.6                               Ok   ….
Switch#
```

Step 11 Use the **delete** command on the active supervisor to delete the PROM upgrade program from bootflash

The following example shows how to delete the cat4500-e-ios-promupgrade-122_44r_SG9 image from bootflash:

```
Switch# delete bootflash:cat4500-e-ios-promupgrade-122_44r_SG9
```

Step 12 On a redundant system, also delete the upgrade file from the standby supervisor engine:

```
Switch# delete slavebootflash:cat4500-e-ios-promupgrade-122_44r_SG9
```

The ROMMON has now been upgraded.

See the "Upgrading the Cisco IOS Software" section on page 36 for instructions on how to upgrade the Cisco IOS software on your switch.

Upgrading the Supervisor Engine ROMMON Remotely Using Telnet

Caution To avoid actions that might make your system unable to boot, read this entire section before starting the upgrade.

Follow this procedure to upgrade your supervisor engine ROMMON to Release 12.2(44r)SG9. This procedure can be used when console access is not available and when the ROMMON upgrade must be performed remotely.

Note In the following section, use the PROM upgrade version bootflash:cat4500-e-ios-promupgrade-122_44r_SG9.

Step 1 Establish a Telnet session to the supervisor engine.

Note In the following discussion, we assume that at least one IP address has been assigned to either an SVI or a routed port.

Step 2 Download the bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 program from Cisco.com, and place it on a TFTP server in a directory that is accessible from the switch to be upgraded.

The bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 programs are available on Cisco.com at the same location from which you download Catalyst 4500 system images.

Step 3 Use the **dir bootflash:** command to ensure that there is sufficient space in Flash memory to store the PROM upgrade image. If there is insufficient space, delete one or more images, and then enter the **squeeze bootflash:** command to reclaim the space.

If you are using a CompactFlash card, replace **bootflash:** with **slot0:**.

Step 4 Download the bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 program into Flash memory using the **copy tftp** command.

The following example shows how to download the PROM upgrade image bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 from the remote host 172.20.58.78 to bootflash:

```
Switch# copy tftp: bootflash:
Address or name of remote host [172.20.58.78]?
Source filename [bootflash:cat4500-e-ios-promupgrade-122_44r_SG9]?
Destination filename [bootflash:cat4500-e-ios-promupgrade-122_44r_SG9]?
Accessing tftp://172.20.58.78/ bootflash:cat4500-e-ios-promupgrade-122_44r_SG9...
Loading bootflash:cat4500-e-ios-promupgrade-122_44r_SG9 from 172.20.58.78 (via
FastEthernet2/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!
[OK - 455620 bytes]
```

```
455620 bytes copied in 2.644 secs (172322 bytes/sec)
Switch#
```

Step 5 Use the **no boot system flash bootflash:***file_name* command to clear all BOOT variable commands in the configuration file. In this example, the BOOT variable was set to boot the image cat4000-i5s-mz.121-19.EW1.bin from bootflash:

```
Switch# configure terminal
Switch(config)# no boot system flash bootflash:cat4000-i5s-mz.121-19.EW1.bin
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3641 to 1244 bytes [OK]
Switch#

Use the boot system flash bootflash:file_name command to set the BOOT variable. You will
use two BOOT commands: one to upgrade the ROMMON and a second to load the Cisco IOS
software image after the ROMMON upgrade is complete. Notice the order of the BOOT
variables in the example below. At bootup the first BOOT variable command upgrades the
ROMMON. When the upgrade is complete the supervisor engine will autoboot, and the second
BOOT variable command will load the Cisco IOS software image specified by the second BOOT
command
```

Note The **config-register** must be set to autoboot.

```
In this example, we assume that the console port baud rate is set to 9600 bps and that the
config-register is set to 0x0102.

Use the config-register command to autoboot using image(s) specified by the BOOT variable.
Configure the BOOT variable to upgrade the ROMMON and then autoboot the IOS image after
the ROMMON upgrade is complete. In this example, we are upgrading the ROMMON to version
12.2(44r)SG9. After the ROMMON upgrade is complete, the supervisor engine will boot Cisco
IOS software Release 15.0(2)SG.

config-register to 0x0102.

Switch# configure terminal
Switch(config)# boot system flash bootflash:
bootflash:cat4500-e-ios-promupgrade-122_44r_SG9
Switch(config)# boot system flash bootflash:cat4500e-entservices-mz.1550-1.SG
Switch(config)# config-register 0x0102
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3641 to 1244 bytes [OK]
Switch#
```

Step 6 Use the **show bootvar** command to verify the boot string. The BOOT variable in this example will first run the PROM upgrade to upgrade ROMMON. Then, the upgrade software will reload and the supervisor engine will load the Cisco IOS software image.

```
Switch# show bootvar
BOOT variable = bootflash:cat4000-ios-promupgrade-121_20r_EW1,1;bootflash:cat400
0-i9s-mz.121-20.EW1,1
CONFIG_FILE variable does not exist
BOOTLDR variable does not exist
Configuration register is 0x2102
```

Step 7 Run the PROM upgrade program by issuing the **reload** command. Issuing this command will terminate your Telnet session.

Caution Verify the boot string in step 6. No intervention is necessary to complete the upgrade. To ensure a successful upgrade, do not interrupt the upgrade process. Do not perform a reset, power cycle, or OIR of the supervisor engine until the upgrade is complete.

The following example shows the console port output from a successful ROMMON upgrade followed by a system reset. Your Telnet session is disconnected during the ROMMON upgrade, so you will not see this output. This step could take 2-3 minutes to complete. You will need to reconnect your Telnet session after 2-3 minutes when the Cisco IOS software image and the interfaces are loaded.

```
Switch# reload
Proceed with reload? [confirm]

1d05h: %SYS-5-RELOAD: Reload requested




 ***********************************************************
 *                                                         *
 * Welcome to Rom Monitor for WS-X4515 System.            *
 * Copyright (c) 2002 by Cisco Systems, Inc.               *
 * All rights reserved.                                    *
 *                                                         *
 ***********************************************************

 Rom Monitor Program Version 12.1(12r)EW

 Board type 2, Board revision 7
 Swamp FPGA revision 28, Dagobah FPGA revision 86

***** The system will autoboot in 5 seconds *****


 Type control-C to prevent autobooting.
 . . . . .
 Established physical link 100MB Full Duplex
 Network layer connectivity may take a few seconds


 ******** The system will autoboot now ********


 config-register = 0x0102
 Autobooting using BOOT variable specified file.....

 Current BOOT file is --- bootflash:cat4000-ios-promupgrade-121_20r_EW1




 ***********************************************************
 *                                                         *
 * Rom Monitor Upgrade Utility For  WS-X4515 System       *
 * This upgrades flash Rom Monitor image to the latest    *
 *                                                         *
 * Copyright (c) 2002, 2003 by Cisco Systems, Inc.        *
 * All rights reserved.                                    *
 *                                                         *
 ***********************************************************

 Image size = 314.236 KBytes
 Maximum allowed size = 511.75 KBytes


 Upgrading your PROM... DO NOT RESET the system
 unless instructed or upgrade of PROM will fail !!!

 Beginning erase of 0x80000 bytes at offset 0x3f80000...  Done!

 Beginning write of prom  (0x4e8ec bytes at offset 0x3f80000)...

 This could take as little as 30 seconds or up to 2 minutes.
 Please DO NOT RESET!

 Success! The prom has been upgraded successfully.
 System will reset itself and reboot in about 15
.
.(output truncated)
.
******** The system will autoboot now ********


 config-register = 0x0102
 Autobooting using BOOT variable specified file.....

 Current BOOT file is --- bootflash:cat4000-i9s-mz.121-20.EW1

Rommon reg: 0x56000380

Running IOS...

Decompressing the image
################################################################################
################################################################################
################################################################################
################################################################################
################################################################################
#################################################################### [OK]
```

Step 8 Use the **no boot system flash bootflash:***file_name* command to clear the BOOT command used to upgrade the ROMMON.

```
Switch# configure terminal
Switch(config)# no boot system flash bootflash:cat4000-ios-promupgrade-121_20r_EW1
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3641 to 1244 bytes [OK]
Switch#
```

Step 9 Use the **show version** command to verify that the ROMMON has been upgraded.

```
Switch# show version
Cisco Internetwork Operating System Software
IOS (tm) Catalyst 4000 L3 Switch Software (cat4000-I9S-M), Version 12.1(20)EW, E
ARLY DEPLOYMENT RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/tac
Copyright (c) 1986-2003 by cisco Systems, Inc.
Compiled Wed 22-Oct-03 23:42 by kellmill
Image text-base: 0x00000000, data-base: 0x00F56DDC

ROM: 12.1(20r)EW1
Dagobah Revision 86, Swamp Revision 28
```

```
Switch uptime is 0 day, 0 hour, 5 minutes
System returned to ROM by reload
System image file is "bootflash:cat4000-i9s-mz.121-20.EW1"

cisco WS-C4503 (XPC8245) processor (revision 7) with 524288K bytes of memory.
Processor board ID FOX06460YD8
Last reset from Reload
3 Ethernet/IEEE 802.3 interface(s)
51 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)
403K bytes of non-volatile configuration memory.

Configuration register is 0x0102

Switch#
```

Step 10 Use the **delete** command to delete the PROM upgrade program from bootflash and the **squeeze** command to reclaim unused space.

The following example shows how to delete the cat4000-ios-promupgrade-121_20r_EW1 image from bootflash and reclaim unused space:

```
Switch# delete bootflash:cat4000-ios-promupgrade-121_20r_EW1
Switch# squeeze bootflash:

All deleted files will be removed, proceed (y/n) [n]? y

Squeeze operation may take some time, proceed (y/n) [n]? y
Switch#
```

Step 11 Use the **show bootvar** command to verify that the ROMMON upgrade program has been removed from the BOOT variable.

```
Switch# show bootvar
BOOT variable = bootflash:cat4000-i9s-mz.121-20.EW1,1
CONFIG_FILE variable does not exist
BOOTLDR variable does not exist
Configuration register is 0x0102
```

The ROMMON has now been upgraded.

See the "Upgrading the Cisco IOS Software" section on page 36 for instructions on how to upgrade the Cisco IOS software on your switch.

Upgrading the Cisco IOS Software

Caution To avoid actions that might make your system unable to boot, please read this entire section before starting the upgrade.

Before you proceed, observe the following rules for hostname:

- Do not expect case to be preserved

  Uppercase and lowercase characters look the same to many internet software applications. It may seem appropriate to capitalize a name the same way you might do in English, but conventions dictate that computer names appear all lowercase. For more information, refer to RFC 1178, Choosing a Name for Your Computer.

- Must start with a letter and end with a letter or digit.
- Interior characters can only be letters, digits, and hyphens; periods and underscores not allowed.
- Names must be 63 characters or fewer; hostname of fewer than 10 characters is recommended.
- On most systems, a field of 30 characters is used for the host name and the prompt in the CLI. Longer configuration mode prompts may be truncated.

To upgrade the Cisco IOS software on your Catalyst 4500 series switch, use this procedure:

Step 1 Download Cisco IOS Release 15.01(2) from Cisco.com, and place the image on a TFTP server in a directory that is accessible from the supervisor engine that is upgraded.

Step 2 Use the **dir bootflash:** command to ensure that there is sufficient space in Flash memory to store the **promupgrade** image. If there is insufficient space, delete one or more images, and then enter the **squeeze bootflash:** command to reclaim the space.

If you are using a CompactFlash card, use **slot0:** instead of **bootflash**.

Step 3 Download the software image into Flash memory using the **copy tftp** command.

The following example shows how to download the Cisco IOS software image cat4000-is-mz.121-12c.EW from the remote host 172.20.58.78 to bootflash:

```
Switch# copy tftp: bootflash:
Address or name of remote host [172.20.58.78]?
Source filename [cat4000-is-mz121_12c.EW]?
Destination filename [cat4000-is-mz.121-12c.EW]?
Accessing tftp://172.20.58.78/cat4000-is-mz.121-12c.EW...
Loading cat4000-is-mz.121-12c.EW from 172.20.58.78 (via
FastEthernet2/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
|!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
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!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 6923388/13846528 bytes]

6923388 bytes copied in 72.200 secs (96158 bytes/sec)
Switch#
```

Step 4 Use the **no boot system flash bootflash:***file_name* command to clear the cat4000-is-mz.121-8a.EW file and to save the BOOT variable.

The following example shows how to clear the BOOT variable:

```
Switch# configure terminal
Switch(config)# no boot system flash bootflash:cat4000-is-mz.121-8a.EW
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3641 to 1244 bytes [OK]
Switch#
```

Step 5 Use the **boot system flash** command to add the Cisco IOS software image to the BOOT variable.

The following example shows how to add the cat4000-is-mz.121-12c.EW image to the BOOT variable:

```
Switch# configure terminal
Switch(config)# boot system flash bootflash:cat4000-is-mz.121-12c.EW
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3641 to 1244 bytes [OK]
Switch#
```

Step 6 Use the **config-register** command to set the configuration register to 0x2102.

The following example show how to set the second least significant bit in the configuration register:

```
Switch# configure terminal
Switch(config)# config-register 0x2102
Switch(config)# exit
Switch# write
Building configuration...
Compressed configuration from 3723 to 1312 bytes [OK]
Switch#
```

Step 7 Enter the **reload** command to reset the switch and load the software.

Caution CautionNo intervention is necessary to complete the upgrade. To ensure a successful upgrade, do not interrupt the upgrade process by performing a reset, power cycle, or OIR of the supervisor, for at least five minutes.

The following example shows the output from a successful upgrade followed by a system reset:

```
Switch# reload
Rommon reg: 0x2B004180

Upgrading FPGA...

Decompressing the image
############## [OK]

 ********************************************************
 *                                                        *
 * WS-X4014 FPGA Upgrade Utility For WS-X4014 Machines *
 *                                                        *
 * Copyright (c) 2002 by Cisco Systems, Inc.              *
 * All rights reserved.                                   *
 *                                                        *
 ***********************************************************

 Image size = 483.944 KBytes

 Maximum allowed size = 1023.75 KBytes


 Upgrading your FPGA image... DO NOT RESET the system
 unless instructed or upgrade of FPGA will fail !!!

 Beginning erase of 0x100000 bytes at offset 0x3d00000...  Done!

 Beginning write of fpga image  (0x78fb0 bytes at offset 0x3d00000)...

 This could take as little as 30 seconds or up to 2 minutes.
 Please DO NOT RESET!
 Success! FPGA image has been upgraded successfully.
 System will reset itself and reboot in about 15 seconds.
 0



 **********************************************************
 *                                                        *
 * Welcome to Rom Monitor for WS-X4014 System.            *
 * Copyright (c) 2002 by Cisco Systems, Inc.              *
 * All rights reserved.                                   *
 *                                                        *
 **********************************************************

 Rom Monitor Program Version 12.1(12r)EW

 Board type 1, Board revision 5
 Swamp FPGA revision 16, Dagobah FPGA revision 47


 MAC Address  : 00-30-85-XX-XX-XX
 IP Address   : 10.10.10.91
 Netmask      : 255.255.255.0
 Gateway      : 10.10.10.1
 TftpServer   : Not set.
 Main Memory  : 256 MBytes

 ***** The system will autoboot in 5 seconds *****


 Type control-C to prevent autobooting.
Switch#
```

Step 8 Use the **show version** command to verify that the new Cisco IOS release is operating on the switch.

Limitations and Restrictions

These sections list the limitations and restrictions for the current release of Cisco IOS software on the Catalyst 4500 series switch.

- Starting with Release IOS XE 3.3.0SG and IOS 15.1(1)SG, the seven RP restriction was removed.
- When you enter the **permit any any ?** command you will observe the **octal** option, which is unsupported in Cisco IOS Release 12.2(54)SG.

  CSCsy31324
- A Span destination of fa1 is not supported.
- The "keepalive" CLI is not supported in interface mode on the switch, although it will appear in the running configuration. This behavious has no impact on functionality.
- TDR is only supported on interfaces Gi1/1 through Gi1/48, at 1000BaseT under open or shorted cable conditions. TDR length resolution is +/- 10 m. If the cable is less than 10 m or if the cable is properly terminated, the TDR result displays "0" m. If the interface speed is not 1000BaseT, an "unsupported" result status displays. TDR results will be unreliable for cables extended with the use of jack panels or patch panels.

- The following guidelines apply to Fast UDLD:
  - Fast UDLD is disabled by default.
  - Configure fast UDLD only on point-to-point links between network devices that support fast UDLD.
  - You can configure fast UDLD in either normal or aggressive mode.
  - Do not enter the link debounce command on fast UDLD ports.
  - Configure fast UDLD on at least two links between each connected network device. This reduces the likelihood of fast UDLD incorrectly error disabling a link due to false positives.
  - Fast UDLD does not report a unidirectional link if the same error occurs simultaneously on more than one link to the same neighbor device.
- A XML-PI specification file entry does not return the desired CLI output.

  The outputs of certain commands, such as **show ip route** and **show access-lists**, contain non-deterministic text. While the output is easily understood, the output text does not contain strings that are consistently output. A general purpose specification file entry is unable to parse all possible output.

  Workaround (1):

  While a general purpose specification file entry may not be possible, a specification file entry might be created that returns the desired text by searching for text that is guaranteed to be in the output. If a string is guaranteed to be in the output, it can be used for parsing.

  For example, the output of the show ip access-lists SecWiz_Gi3_17_out_ip command is this:

```
Extended IP access list SecWiz_Gi3_17_out_ip
    10 deny ip 76.0.0.0 0.255.255.255 host 65.65.66.67
    20 deny ip 76.0.0.0 0.255.255.255 host 44.45.46.47
    30 permit ip 76.0.0.0 0.255.255.255 host 55.56.57.57
```

  The first line is easily parsed because access list is guaranteed to be in the output:

```
<Property name="access list" alias="Name" distance="1.0" length="-1" type="String"
/>
```

  The remaining lines all contain the term host. As a result, the specification file may report the desired values by specifying that string. For example, this line

```
<Property name="host" alias="rule" distance="s.1" length="1" type="String" />
```

  will produce the following for the first and second rules

```
<rule>
    deny
</rule>
```

  and the following for the third statement

```
<rule>
    permit
<rule>
```

  Workaround (2):

  Request the output of the **show running-config** command using NETCONF and parse that output for the desired strings. This is useful when the desired lines contain nothing in common. For example, the rules in this access list do not contain a common string and the order (three permits, then a deny, then another permit), prevent the spec file entry from using permit as a search string, as in the following example:

```
    Extended MAC access list MACCOY
        permit 0000.0000.ffef ffff.ffff.0000 0000.00af.bcef ffff.ff00.0000 appletalk
        permit any host 65de.edfe.fefe xns-idp
        permit any any protocol-family rarp-non-ipv4
        deny   host 005e.1e5d.9f7d host 3399.e3e1.ff2c dec-spanning
        permit any any
```

The XML output of **show running-config** command includes the following, which can then be parsed programmatically, as desired:

```
<mac><access-list><extended><ACLName>MACCOY</ACLName></extended></access-list></mac>
    <X-Interface> permit 0000.0000.ffef ffff.ffff.0000 0000.00af.bcef ffff.ff00.0000
appletalk</X-Interface>
    <X-Interface> permit any host 65de.edfe.fefe xns-idp</X-Interface>
    <X-Interface> permit any any protocol-family rarp-non-ipv4</X-Interface>
    <X-Interface> deny   host 005e.1e5d.9f7d host 3399.e3e1.ff2c
dec-spanning</X-Interface>
    <X-Interface> permit any any</X-Interface>
```

- Although the Catalyst 4500 series switch still supports legacy 802.1X commands used in Cisco IOS Release 12.2(46)SG and earlier releases (that is, they are accepted on the CLI), they do not display in the CLI help menu.
- Current IOS software cannot support filenames exceeding 64 characters.
- All software releases support a maximum of 32,768 IGMP snooping group entries.
- After upgrading to 12.2(31)SG and later releases, some CPU queues configured as SPAN sources and saved in the startup configuration file do not function as they did in the older software release. The following table reflects this change.

  This only affects a switch that has any of the following queues configured as SPAN source in releases prior to 12.2(31)SG and saved to the startup configuration. The SPAN destination would not get the same traffic after upgrading to 12.2(31)SG.

QueueID	Old QueueName	New QueueName
5	control-packet	control-packet
6	rpf-failure	control-packet
7	adj-same-if	control-packet
8	<unused queue>	control-packet
11	<unused queue>	adj-same-if
13	acl input log	rfp-failure
14	acl input forward	acl input log

  Workaround: After upgrading to 12.2(31)SG and later releases, remove the old SPAN source configuration and reconfigure with the new queue names/IDs. For example:

```
Switch(config)# no monitor session n source cpu queue all rx
Switch(config)# monitor session n source cpu queue <new_Queue_Name>
```

  (CSCsc94802)

- Although you can configure subsecond PIM query intervals on Catalyst 4500 platforms, such an action represents a compromise between convergence (reaction time) and a number of other factors (number of mroutes, base line of CPU utilization, CPU speed, processing overhead per 1 m-route, etc.). You must account for those factors when configuring subsecond PIM timers. We recommend that you set the PIM query interval to a minimum of 2 seconds. By adjusting the available parameters, you can achieve flawless operation; that is, a top number of multicast routes per given convergence time on a specific setup.

- With Cisco IOS Release XE 3.2.1SG, **memory** configuration is enabled:

```
Switch(config)# memory ?
  chunk    chunk related configuration
  free     free memory low water mark
  record   configure memory event/traceback recording options
  reserve  reserve memory
  sanity   Enable memory sanity
```

  This configuration had been removed erroneously in a prior release.

- The Catalyst 4510R switch does not support Supervisor Engines 6L-E. Installing an unsupported supervisor engine causes unpredictable hardware behavior that cannot be controlled by the software. Using an unsupported supervisor engine in a redundant slot might cause a supported supervisor engine in the other slot to malfunction.
- The MAC address table is cleared while you switch between supervisor engines if either the 802.1s or 802.1w Spanning Tree Protocol is configured. To minimize address clearing and subsequent packet flooding, configure the edge ports as **spanning-tree portfast** and the link type as **spanning-tree link-type point-to-point**.
- IP classful routing is not supported; do not use the **no ip classless** command; it will have no effect, because only classless routing is supported. The command **ip classless** is not supported because classless routing is enabled by default.
- A Layer 2 LACP channel cannot be configured with the spanning tree PortFast feature.
- Netbooting using a boot loader image is not supported. See the "Troubleshooting" section on page 70 for alternatives.
- When you deploy redundant supervisors in a Catalyst 4507R, for hardware that does not exist while the startup configuration file is being parsed, the configuration file for the hardware is not applied.

  For example, if the active supervisor engine is in slot 1, and you have configured interface Gi1/1, the supervisor engine in slot 2 becomes active if you remove the active supervisor engine from the chassis. In addition, while the startup configuration file is being parsed, you will receive an error message indicating that interface Gi1/1 is no longer present. This behavior is correct. When the formerly active supervisor engine is reinserted into slot 1, there is no configuration for interface Gi1/1.

  This situation will not occur when both supervisor engines are physically in the chassis.

  Workaround: Copy the startup configuration file into the running configuration:

```
Switch# copy startup-config running-config
```

- An unsupported default CLI for mobile IP is displayed in the HSRP configuration. Although this CLI will not harm your system, you might want to remove it to avoid confusion.

  Workaround: Display the configuration with the **show standby** command, then remove the CLI. Here is an example of **show standby GigabitEthernet1/1** command output:

```
switch(config)# interface g1/1
switch(config)# no standby 0 name (0 is hsrp group number)
```

- For HSRP preempt delay to function consistently, you must use the **standby delay minimum** command. Be sure to set the delay to more than 1 hello interval, thereby ensuring that a hello is received before HSRP leaves the initiate state.

Use the **standby delay reload** option if the router is rebooting after reloading the image.

- When you attempt to run OSPF between a Cisco router and a third party router, the two interfaces might get stuck in the Exstart/Exchange state. This problem occurs when the maximum transmission unit (MTU) settings for neighboring router interfaces do not match. If the router with the higher MTU sends a packet larger than the MTU set on the neighboring router, the neighboring router ignores the packet.

  Workaround: Ensure that the MTUs match.
- You can run only .1q-in-.1q packet pass-through with Supervisor Engine 6-E.
- For PVST and Catalyst 4500 E-Series switch VLAN, Cisco IOS Release 12.1(13)EW support a maximum of 3000 spanning tree port instances. If you want to use more instances, use MST rather than PVST.
- Because the Supervisor Engine 6-E supports the FAT filesystem, the following restrictions apply:
  - The **verify** and **squeeze** commands are not supported.
  - The **rename** command is supported in FAT file system.

    For Supervisor Engine 6-E, the **rename** command is available for bootflash and slot0. For all other supervisor engines, the **rename** command is supported for nvram devices only.
  - The **fsck** command is supported for slot0 device. It is not supported in the file systems on supervisor engines other than 6-E.
  - In the FAT file system, the IOS **format bootflash:** command erases user files only. It does not erase system configuration.
  - The FAT file system supports a maximum of 63 characters for file/directory name. The maximum for path length is 127 characters.
  - The FAT file system does not support the following characters in file/directory names:{}#%^ and space characters.
  - The FAT file system honors the Microsoft Windows file attribute of read-only and read-write, but it does not support the Windows file hidden attribute.
  - Supervisor Engine 6-E uses the FAT file system for compact flash (slot0). If a compact flash is not formatted in FAT file system (such as compact flash on a supervisor engine other than 6-E), the switch does not recognize it.
- If an original packet is dropped because of transmit queue shaping or sharing configurations, a SPAN packet copy can still be transmitted on the SPAN port.
- All software releases support a maximum of 16,000 IGMP snooping group entries.
- To maximize performance, use the **no ip unreachables** command on all interfaces that are configured for ACLs.
- The threshold for the Dynamic Arp Inspection err-disable function is set to 15 ARP packets per second per interface. You should adjust this threshold depending on the network configuration. The CPU should not receive DHCP packets at a sustained rate greater than 1000 pps.
- If you first configure an IP address or IPv6 address on a Layer 3 port, then change the Layer 3 port to a Layer 2 port with the **switchport** command, and finally change it back to a Layer 3 port, the original IP/IPv6 address is lost.
- In a redundant system, do not remove and reinsert the standby supervisor engine while the active supervisor engine is booting. Doing so may cause the online diagnostics test to fail.

  Workaround: Remove and reinsert the standby supervisor engine after the active supervisor engine boots. (CSCsa66509)

- The **switchport private-vlan mapping trunk** command supports a maximum of 500 unique private VLAN pairs. For example, 500 secondary VLANs could map to one primary VLAN, or 500 secondary VLANs could map to 500 primary VLANs.
- Support for PoE depends on the use of the following line cards and power supplies.

  PoE switching modules:

  - WS-X4148-RJ45V
  - WS-X4224-RJ45V
  - WS-X4248-RJ45V
  - WS-X4248-RJ21V
  - WS-X4524-GB-RJ45V
  - WS-X4548-GB-RJ45V
  - WS-X4648-RJ45V-E
  - WS-X4648-RJ45V+E
  - WS-X4548-GB-RJ45V+

  PoE enabled power supplies:

  - PWR-C45-1300ACV
  - PWR-C45-1400DC
  - PWR-C4K-2800AC
  - PWR-C45-1400AC
  - PWR-C45-1300ACV
  - PWR-C45-6000ACV
- If a Catalyst 4500 series switch requests information from the Cisco Secure Access Control Server (ACS) and the message exchange times out because the server does not respond, a message similar to this appears:

  ```
  00:02:57: %RADIUS-4-RADIUS_DEAD: RADIUS server 172.20.246.206:1645,1646 is not
  responding.
  ```

  If this message appears, ensure network connectivity exists between the switch and the ACS. Also check that the switch has been properly configured as an AAA client on the ACS.
- For IP Port Security (IPSG) for static hosts, the following apply:
  - As IPSG learns the static hosts on each interface, the switch CPU may achieve 100 percent if there are a large number of hosts to learn. The CPU usage will drop after the hosts are learned.
  - IPSG violations for static hosts are printed as they occur. If multiple violations occur simultaneously on different interfaces, the CLI displays the last violation. For example, if IPSG is configured for 10 ports and violations exist on ports 3,6, and 9, the violation messages are printed only for port 9.
  - Inactive host bindings will appear in the device tracking table when either a VLAN is associated with another port or a port is removed from a VLAN. So, as hosts are moved across subnets, the hosts appear in the device tracking table as inactive.
  - Autostate SVI does not work on EtherChannel.
- When IPv6 is enabled on an interface with any CLI, you might see the following message:

  ```
  % Hardware MTU table exhausted
  ```

In such a scenario, the IPv6 MTU value programmed in hardware differs from the IPv6 interface MTU value. This occurs if no room exists in the hardware MTU table to store additional values.

To create room, unconfigure some unused MTU values. Then, either disable or re-enable IPv6 on the interface, or reapply the MTU configuration.

- To stop IPSG with static hosts on an interface, use the following commands in interface configuration submode:

```
Switch(config-if)# no ip verify source
Switch(config-if)# no ip device tracking max
```

To enable IPSG with static hosts on a port, enter the following commands:

```
Switch(config)# ip device tracking ****enable IP device tracking globally
Switch(config)# ip device tracking max <n> ***set an IP device tracking maximum on int
Switch(config-if)# ip verify source tracking [port-security] ****activate IPSG on port
```

Caution If you configure the **ip verify source tracking [port-security]** interface configuration command on a port without enabling IP device tracking globally or setting an IP device tracking maximum on that interface, IPSG with static hosts reject all the IP traffic from that interface.

Note The preceding condition also applies to IPSG with static hosts on a PVLAN host port.

- uRPF supports up to four paths. If a packet arrives at one of the valid VLANs that is not programmed as one of the RPF VLAN in hardware, it is dropped. If traffic may arrive from any other interfaces without RPF configured, it can be switched.
- Input and output ACLs cannot override or filter traffic received on an uRPF interface.
- No CLI command exists to reflect uRPF drop packets during hardware switching. The **sh ip traffic** and **show cef int** commands do not reflect uRPF drops.
- IPv6 ACL is not supported on a switchport. IPv6 packets cannot be filtered on switchports using any of the known methods: PACL, VACL, or MACLs.
- Class-map match statements using **match ip prec | dscp** match only IPv4 packets, whereas matches performed with **match prec | dscp** match both IPv4 and IPv6 packets.
- IPv6 QoS hardware switching is disabled if the policy-map contains IPv6 ACL and match CoS in the same class-map with the IPv6 access-list has any mask within the range /81 and /127. This situation causes forwarding packets to software, which efficiently disables the QoS.
- When the following data-only Catalyst 4500 linecards are used in a Catalyst 4507R-E or 4510R-E chassis with Supervisor Engine 6-Es, the capacity of the power supply may be exceeded:
  - WS-X4148-FX-MT Cisco Catalyst 4500 Fast Ethernet Switching Module, 48-port 100BASE-FX (MT-RJ)
  - WS-X4448-GB-RJ45 Cisco Catalyst 4500 48-port 10/100/1000 Module (RJ-45)

  The Catalyst 4503-E and Catalyst 4506-E have no caveats. The Catalyst 4507R-E configurations that use power supplies rated at 1400 W or above also have no caveats.

  The following replacement switching modules will not exceed the power supply capacity for any Catalyst 4500-E chassis:

	Recommended Replacement	Description
WS-X4148-FX-MT	WS-X4248-FE-SFP	Fast Ethernet, 48-port 100BASE-X (SFP)
WS-X4448-GB-RJ45	WS-X4548-GB-RJ45	Enhanced 48-port 10/100/1000 Module (RJ-45)
WS-X4448-GB-RJ45	WS-X4648-RJ45V-E	E-Series 48-port 802.3af PoE 10/100/1000 (RJ-45)

Refer to the *Catalyst 4500 Series Module Installation Guide* to determine the power requirements for all of the Catalyst 4500 linecards and the power capacities of the Catalyst 4500 power supplies.

- Supervisor Engine 6-E *only* supports Catalyst 4500 Series linecards in slots 8-10.
- If you remove a line card from a redundant switch and initiate an SSO switch-over, then reinsert the line card, all interfaces are shutdown. The remaining configuration on the original line card is preserved.

  This situation only occurs if a switch reached SSO before you removed the line card.
- On Supervisor Engine 6-E, upstream ports support flow control auto negotiation in 1G mode only, and flow control is forced in 10G mode. If the interface is configured to auto-negotiate the flow control, and the interface is operating in 10G mode, the system forces flow control to ON and does not auto-negotiate.
- Supervisor Engine 6-E supports fast UDLD on a maximum of 32 ports.
- With Cisco IOS Release 12.2(53)SG3 (and 12.2(54)SG), we changed the default behavior such that your single supervisor, RPR, or fixed configuration switch does not reload automatically. To configure automatic reload, you must enter the **diagnostic fpga soft-error recover aggressive** command. (CSCth16953)
- Energywise WOL is not “waking up” a PC in hibernate or standby mode.

  Workaround: None. CSCtr51014
- The ROMMON version number column in the output of **show module** command is truncated.

  Workaround: Use the **show version** command. CSCtr30294
- IP SLA session creation fails randomly for various 4-tuples.

  Workaround: Select an alternate destination or source port. CSCty05405
- The system cannot scale to greater than 512 SIP flows with MSP and metadata enabled.

  Workaround: None. CSCty79236
- On the following linecards running IOS Release 15.0(2)SG3:
  - 48 10/100/1000BaseT Premium POE E Series WS-X4648-RJ45V+E (JAE14310RHU)
  - 6 Sup 6-E 10GE (X2), 1000BaseX (SFP) WS-X45-SUP6-E (JAE13104VVY)

  the following restrictions apply:
  - Sub-interrfaces are not supported on 1 Gigabit and Ten-Gigabit interfaces.
  - Port-channel members do not support multiple classification criteria for a QoS policy.
  - CEF is disabled automatically when uRFP is enabled and TCAM is fully utilized.

- While configuring an IPv6 access-list, if you specify "hardware statistics" as the first statement in v6 access-list mode (i.e. before issuing any other v6 ACE statement), it will not take effect. Similarly, your "hardware statistics" configuration will be missing from the output of the **show running** command.

  Workaround: During IPv6 access-list configuration, configure at least one IPv6 ACE before the "hardware statistics" statement. CSCuc53234
- For any configuration where the source-interface keyword is used, if you provide an SVI that is associated with a secondary private VLAN, configuration involving the secondary VLAN may be lost when the switch is reloaded. In such scenarios, always use the primary private VLAN.
- When performing an ISSU between any releases prior to Cisco IOS 15.1(1)SG or 3.3.0SG to release Cisco IOS 15.1(1)SG (or 3.3.0SG) or higher, a switch performing multicast routing may persistently drop traffic after the upgrade completes. You can recover multicast traffic by reloading the chassis. Alternately, you can remove all multicast configuration prior to ISSU, and add it back when ISSU completes. CSCuj42672

Caveats

Caveats describe unexpected behavior in Cisco IOS releases. Caveats listed as open in a prior release are carried forward to the next release as either open or resolved.

Note All caveats in Release 12.4 also apply to the corresponding 12.1 E releases. Refer to the *Caveats for Cisco IOS Release 12.4* publication at the following URL:

http://www.cisco.com/en/US/docs/ios/12_4/release/notes/124MCAVS.html

Note For the latest information on PSIRTS, refer to the Security Advisories on CCO at the following URL:

http://tools.cisco.com/security/center/publicationListing

Open Caveats for Cisco IOS Release 15.1(1)SG2

This section lists the open caveats for Cisco IOS Release 15.1(1)SG2:

- When you enter the **ip http secure-server** command (or if the system reads it from the startup configuration), the device searches for a persistent self-signed certificate during boot up.
  - If such a certificate does not exist and the device's hostname and default_domain are set, then a persistent self-signed certificate is generated.
  - If such a certificate exists, the FQDN in the certificate is compared with the current device's hostname and default_domain. If either differs from the FQDN in the certificate, the existing persistent self-signed certificate is replaced with a new one with the updated FQDN. Be aware that the existing key pair is used in the new certificate.

  On a switch that supports redundancy, the generation of the self-signed certificate occurs independently on the active and the standby supervisor engines, and the certificates differ. After switchover, the HTTP client that holds the old certificate cannot connect to the HTTPS server.

  Workaround: Reconnect. CSCsb11964

- When policing IEEE 802.1Q tagged non-IP traffic and calculating traffic conformance, the policer excludes the four bytes that constitute the 802.1Q tag even when you enter the **qos account layer2 encapsulation** command.

  Workaround: None. CSCsg58526

- When hard-coded duplex and speed settings are deleted after an interface shuts down, an **a-** is added to the duplex and speed in the output from the **show interface status** command.

  This does not affect performance.

  Workaround: Enter the **no shutdown** command. CSCsg27395

- When a transceiver is removed rapidly from one port and placed in another on the same chassis, occasionally a duplicate seeprom message appears and the port is not able to handle traffic.

  Workaround: Remove the transceiver from the new port and place it in the old port. After the SFP is recognized in the old port, remove it slowly and insert it in the new port. (CSCse34693)

- When performing an ISSU upgrade and the versions of the active and standby supervisor engines differ, you see the following message in the standby supervisor engine console:

  ```
  %XDR-6-XDRINVALIDHDR: XDR for client (CEF push) dropped (slots:2 from slot:3
  context:145 length:11) due to: invalid context
  ```

  Workaround: None. This is an informational message. CSCsi60898

- An IP unnumbered configuration is lost after a switch reloads.

  Workarounds: Do one of the following:

  - After a reload, copy the startup-config to the running-config.
  - Use a loopback interface as the target of the **ip unnumbered** command.
  - Change the CLI configuration so that during bootup the router port is created first.

  CSCsq63051

- In SSO mode, when a port channel is created, deleted, and recreated on an active supervisor engine with the same channel number, the standby port channel state goes out of sync. After a switch over, the following message displays:

  ```
  %PM-4-PORT_INCONSISTENT: STANDBY:Port is inconsistent:
  ```

  Workaround: When the port channel starts to flap, enter **shut** and **no shut** on the port channel. After the first switchover and after deleting the port channel, create a new channel. CSCsr00333

- VTP databases do not propagate through promiscuous trunk ports. If only promiscuous trunks are configured, you will not see the VLAN updates on the other switches in the VTP domain.

  Workaround: Configure an ISL/dot1q trunk port. CSCsu43445

- When you remove a line card containing ports configured with IGMP snooping while booting a standby supervisor engine, the active supervisor engine does not synchronize this configuration to the standby supervisor engine as a part of a bulk synchronization. When you reinstall the line card, the configuration in the active and standby supervisor engines will differ.

  Workaround: Do one of the following:

  - Reload the standby switch again with the line card in place.
  - Remove and reenter the commands on the active supervisor engine. The standby supervisor engine will acquire this change. CSCsv44866

- After posture validation succeeds, the following benign traceback messages may appear after you unconfigure the **global RADIUS** and **IP device tracking** commands:

  ```
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.101   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.102   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  ```

  This applies to classic or E-series Catalyst 4500 supervisor engines running Cisco IOS Release 12.2(50)SG

  Workaround: None. CSCsw14005

- The host's MAC address is not synchronized to the standby supervisor engine after you unconfigure 802.1X on the port and reconnect the host to a IP phone (with CDP port status TLV support) that is connected to the switch.

  If the switch were to run a supervisor switchover while in this state, the host's MAC address would not be present in the new active supervisor engine’s MAC address table, causing possible connectivity interruption on the host.

  Workaround: Enter the **shutdown** command, followed by the **no shutdown** command on the interface. This triggers relearning and synchronizing of the host's MAC to the standby supervisor engine. CSCsw91661

- If you simultaneously apply a service-policy to a port in the output direction and a service-policy to a vlan-range under that port in the output direction, the class-map hit counters in the output of the **show policy-map interface** command are wrong.

  Workaround: None.

  The queue transmit counters as well as the policing statistics (if any) are correct. CSCsz20149

- On a wireless control system (WCS), some device information is incorrectly displayed for PCs sitting behind an lldp-med capable phone. Specifically, WCS displays the phone's serial number, model number, and software version in the PC's device information. All other information about the PC is correctly displayed on WCS.

  This only happens when the switch is running network mobility service protocol (nmsp). It does not happen if the phone is CDP enabled.

  Workaround: Use the VLAN ID or name to differentiate the IP phone and the PC sitting behind the phone on the WCS.

  The IP phone is detected on the voice VLAN, and the displayed information of serial number, model number, and software version is correct. However, a PC sitting behind the phone is detected on a data VLAN, and the displayed device information is wrong and should be ignored.

  CSCsz34522

- When you run Cisco IOS Release 12.2(53)SG1, 12.2(50)SG6, or later releases and configure switchport block multicast on a switch, Layer 2 multicast is not blocked. IPv4 and IPV6 unknown multicast traffic is blocked.

  Prior to Cisco IOS Release 12.2(53)SG1 and 12.2(50)SG6, the switchport block multicast command blocks IP Multicast, Layer 2 multicast, and broadcast traffic. CSCta61825

  Workaround: None CSCtb30327

- If *time* is not specified in the **link debounce** command, the default value depends on the supervisor engine. The default is 10 mS for a Catalyst 4900M switch, Supervisor Engine 6-E, and Supervisor Engine 6L-E. The default is 100 mS for all other supervisor engines.

Despite the different default value, you can configure any value in the time range.

Workaround: None. CSCte51948

- On a peer interface on a Catalyst 4948E Ethernet Switch, if errdisabled mode flap detection is set to a very small number (such as 2 flaps in 10 sec), a 10GE link flap may cause the peer interface to enter the errdisabled state.

  Workarounds: The Cisco switch default link-flap detection value is 5 flaps in 10 seconds. Use the default value or larger numbers. CSCtg07677

- After you have enabled EPM logging and the client is authenticated via MAB or Webauth, the value of AUTHTYPE is DOT1X in EPM syslog messages irrespective of the authentication method.

  Similarly, the **show epm sessions** command always displays the authentication method as DOT1X.

  Workaround: To view the authentication method used for a client, enter the **show authentication sessions** command. CSCsx42157

- With CFM enabled globally as well as on an ingress interface, CFM packets received on the interface are not policed with hardware control plane policing.

  Workaround: None. CSCso93282

- When either the RADIUS-server test feature is enabled or RADIUS-server dead-criteria is configured, and either RADIUS-server deadtime is set to 0 or not configured, the RADIUS-server status is not properly relayed to AAA.

  Workaround: Configure both dead-criteria and deadtime.

  ```
  radius-server dead-criteria
  radius-server deadtime
  ```

  CSCtl06706

- When you configure open authentication and perform SSO, the spanning tree state and MAC address are not synchronized to the new standby supervisor engine. This behavior interrupts traffic only after the second switchover because the new standby supervisor engine possesses the wrong state after the initial switchover and the second switchover starts the port in the blocking state.

  Workaround: Enter **shut** and **no shut** on the port to synchronize the STP state. CSCtf52437

- A device in a Guest VLAN that is connected behind a phone capable of 2nd-port-TLV, experiences packet loss following a SSO failover. The device experiences an authentication restart after the first CDP frame arrives from the phone.

  Workaround: None. CSCto46018

- If you reboot a switch, the configured value of the interface MTU size for the elements of the port channel interface does not work for IPv6 traffic.

  Workaround: After the switch reloads, enter **shut** and **no shut** on the port-channel interface.

  CSCto27085

- When you have two Layer 3 CE-facing interfaces, each connected to a CE to split WCCP between the CEs, and you move a WCCP service (such as 60 (ftp-native)) from one interface to the other, the target interface fails to completely transfer the service from the old to the new CE.

  Workaround: Shut down the CE-facing interface. After all of the mask-value entries point to the target CE, unshut the CE-facing interface. CSCtl09941

- Dynamic ACLs do not function correctly if they include advanced operators, including dscp/ipp/tos, log/log-input, fragments and/or tcp flag operators.

  Workaround: Remove these operators from any dynamic ACLs. CSCts05302

- Occasionally, if you use an X2 SR transceiver on a WS-X4706-10GE running Cisco IOS Release 12.2(40)SG, you observe CRC errors after a reload or power cycle upon inserting the card or X2.

  Workaround: Reinsert the X2. CSCsk43618

- If *burst* is not explicitly configured for a single rate policer, the **show policy-map** command displays an incorrect burst value.

  Workaround: Enter the **show policy-map interface** command to find the actual *burst* value programmed. CSCsi71036

- When you enter the **show policy-map vlan** *vlan* command, unconditional marking actions that are configured on the VLAN are not shown.

  Workaround: None.

  If you enter the **show policy**-**map** *name*, however, the unconditional marking actions appear. CSCsi94144

- Uplinks go down when you upgrade the ROMMON of an WS-X45-SUP6-E supervisor from version 0.34 to a later version.

  This behavior occurs in a redundant switch when the active supervisor engine is running Cisco IOS, the standby supervisor engine is in ROMMON, and the standby supervisor engine's ROMMON is upgraded from version 0.34 or to a later version. The upgrade process causes the uplinks on the standby supervisor engine to go down but the active supervisor engine is unaware of this.

  Workarounds: To resume normal operation, do one of the following:

  - Reload both supervisor engines with the **redundancy reload shelf** command.
  - Power-cycle the standby supervisor engine by briefly pulling it from the chassis.

    There is *no* workaround for the link flap issue. CSCsm81875

- Changing the flow control configuration with traffic and pause frames causes some traffic loss.

  This problem can happen when pause frames are sent to a switch port and the flow control receive configuration is toggled on a 10-Gigabit Ethernet port.

  Workaround: Change the flow control receive configuration when no traffic exists. CSCso71647

- If an EtherChannel is a member of a FlexLink pair, then static MAC addresses configured on the EtherChannel are not moved to the alternate port when the EtherChannel fails (FlexLink failure).

  Workaround: None. CSCsq99468

- When a CFM Inward Facing MEP (IFM) is configured on a VLAN that is not allocated on a switch port that is DOWN, the **show ethernet cfm maintenance-points local** command displays the IFM CC Status as inactive. When you allocate the VLAN, the CC-status remains inactive.

  You only see this behavior if you initially did not allocate a VLAN before you configure the IFM, and then later allocate the same VLAN.

  Workaround: Unconfigure, and then reconfigure the IFM on the port.

- When you configure **vlan dot1q tag native** globally on Supervisor Engine 6-E, MST control packets are tagged on egress on the native VLAN. This conflicts with 802.1s. The Cisco 7600 Series router drops its MST proposal agreements (because it expects the native VLAN MST control packets to be untagged), causing 30 seconds of traffic loss while spanning tree converges.

  Workaround: Disable native VLAN tagging on the trunk port of the switch by entering the **no switchport trunk native vlan tag** command. CSCsz12611

- Before large PACLs are fully loaded in hardware, you might observe a false completion messages like the following:

  ```
  Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-HWPROGSUCCESS: Input Security: pacl - now
  fully loaded in hardware *Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-ALLACLINHW: All
  configured ACLs now fully loaded in hardware - hardware switching / QoS restored.
  ```

  Workaround: No functional impact.

  You must wait for the ACLs to be programmed before performing other TCAM related changes. CSCtd57063

- If a large number of VLAN mappings are configured, a member port might fail to join a port channel and no warming is issued.

  Workaround: Reduce the number of VLAN mappings. CSCtn56208

- WCCP service is not reacquired when a service group with a multicast group address is unconfigured, and then reconfigured.

  Workaround: Configure IP multicast routing globally and establish IP PIM sparse dense mode on the CE-facing interface. CSCtl97692

- If an interface whose IP address is being used as the router ID is deleted or shuts down, and you configure a service group with a multicast group address, packet redirection to CE stops and packets are forwarded directly to the destination.

  Workaround: Unconfigure and reconfigure the service group. CSCtn88087

- Global WCCP service configuration fails to enable (WCCP global configuration is accepted but nvgen fails) on a newly deployed switch if the switch is not enabled for SVI or a Layer 3 interface.

  Workaround: Enable a Layer 3 interface in the running configuration. CSCsc88636.

- If you use the **quick** option in the **issu changeversion** command, the following might occur:
  - Links flap for various Layer 3 protocols.
  - A traffic loss of several seconds is observed during the upgrade process.

  Workaround: Do not use the **quick** option with the **issu changeversion** command. CSCto51562

- A peer policy is not updated after reauthentication if the policy is changed on the AS beforehand. After reauthentication, the original peer policy is retained.

  Workaround: Enter **shut** and **no shut** on the port. CSCts29515

- When you enable both Cisco TrustSec and RADIUS accounting, a disparity occurs between the RADIUS client (Cisco switch) and the RADIUS/CTS server in how the authenticator field in the header is computed for DOT1X/RADIUS accounting messages.

  A Cisco IOS AAA client uses the PAC secret to compute the authenticator; Cisco Secure ACS 5.2 uses the shared secret. This behavior causes a mismatch that results in a rejection of the accounting message, and the client marks the server as unresponsive.

  Workaround: None. You must disable 802.1X accounting. CSCts26844

- When more than one Equal Cost Multipath (ECMP) is available on the downstream switch, and Mediatrace is invoked to provide flow statistics, the dynamic policy does not show statistics for a flow.

  Mediatrace cannot find the correct inbound interface and applies the dynamic policy on a different interface from the one used for media flow.

  Workaround: None. CSCts20229

- When a switchover is created on the Mediatrace responder, the dynamic access list created for a monitored flow tuple is not deleted. Although the Mediatrace initiator creates another set of dynamic access lists after the switchover, the old ones remain in the configuration.

  The impact of stale dynamic access lists is to monitor unwanted traffic.

  Workarounds:

  - If the switchover is scheduled, remove the scheduled session on the initiator. Reschedule the session after the new active supervisor engine boots on the responder.
  - If the Mediatrace responder SSO is not planned, after the new active supervisor engine boots, manually delete the stale dynamic access lists. CSCty75070
- Configuring an interface as unidirectional with the **unidirectional send-only | receive-only** command still allows the interface to send (configured as Send-only Unidirection Ethernet mode) or receive (configured as Receive-only Unidirection Ethernet mode) packets in a bidirectional mode.

  Workaround: None. CSCtx95359
- When you add a "bfd" suffix to the **snmp server host** *x.x.x.x* configuration command, the BFD traps, ciscoBfdSessUp and ciscoBfdSessDown, are not generated.

  Workaround: Do not specify a "bfd" suffix with the **snmp-server host** *x.x.x.x* configuration command. CSCtx51561
- When you transfer a startup-config to the switch directly without entering **write mem**, and the startup-config contains the **hw-module uplink shared-backplane** command, the four ports on a Supervisor Engine 6-E are not activated in subsequent reloads. The second port of each supervisor engine remains inactive.

  Workaround: Configure **hw-module uplink shared-backplane** from the console or vty, and enter **write mem**. CSCtx43568
- During either a system- or user-initiated reload operation, the following message is observed when the system shuts down:

  ```
  HARDWARE WATCHDOG
  ```

  This message is not observed during a system bootup.

  Workaround: None required. This message is information only. CSCtz15738
- With IGMP snooping enabled, multicast traffic received through a tunnel interface is not forwarded out the Outgoing Interface List.

  Workaround: Disable IGMP snooping. CSCuc65538
- When a port connected to a CDP speaker goes down, a small memory leak occurs (typically less than 300 bytes).

  Workaround: Disable CDP on interfaces that may flap frequently. CSCub85948
- A GLC-GE-100FX pluggable may not operate when used in WS-X4624-SFP-E, WS-X4640-CSFP-E or WS-X4612-SFP-E modules.

  Workaround: None CSCui23911

Resolved Caveats in Cisco IOS Release 15.1(1)SG2

This section lists the resolved caveats in Cisco Release 15.1(1)SG2:

- After booting a switch with Cisco IOS XE 3.3.0SG or 3.3.1SG with a crypto (k9) image, a linecard may display a status of Auth Fail, and will not be brought online. Non-crypto images are unaffected.

Workaround: Reset the linecard either with the **hw-module module** *m* **reset** command or through a manual OIR. CSCuc64146

- Following an upgrade to Cisco IOS XE 3.3.1SG, a switch with a power supply of type PWR-C45-4200ACV may display one of the following messages:

```
%C4K_CHASSIS-3-INSUFFICIENTPOWERSUPPLIESDETECTED: Insufficient power supplies present
for specified config
%C4K_CHASSIS-3-MIXINVOLTAGEDETECTED: Power supplies in the chassis are receiving
different voltage inputs
%C4K_CHASSIS-3-MIXINPOWERDETECTED: Power supplies in the chassis are of different
types (AC/DC) or wattage
```

The power supply or power supply inputs are incorrectly listed as 110V when they should be list as 220V. The power supply may go into an err-disable state if only one power supply has the issue. If both power supplies have the issue and are both recognized as 110V, they will not go into an err-disable state. Additionally, other modules in the switch might be denied power and will not power on.

Workaround: Remove the power supply inputs, remove or reinsert the power supply, then restore the power supply inputs. CSCuc07562

Open Caveats for Cisco IOS Release 15.1(1)SG1

This section lists the open caveats for Cisco IOS Release 15.1(1)SG1:

- When you enter the **ip http secure-server** command (or if the system reads it from the startup configuration), the device searches for a persistent self-signed certificate during boot up.
  - If such a certificate does not exist and the device's hostname and default_domain are set, then a persistent self-signed certificate is generated.
  - If such a certificate exists, the FQDN in the certificate is compared with the current device's hostname and default_domain. If either differs from the FQDN in the certificate, the existing persistent self-signed certificate is replaced with a new one with the updated FQDN. Be aware that the existing key pair is used in the new certificate.

  On a switch that supports redundancy, the generation of the self-signed certificate occurs independently on the active and the standby supervisor engines, and the certificates differ. After switchover, the HTTP client that holds the old certificate cannot connect to the HTTPS server.

  Workaround: Reconnect. CSCsb11964

- When policing IEEE 802.1Q tagged non-IP traffic and calculating traffic conformance, the policer excludes the four bytes that constitute the 802.1Q tag even when you enter the **qos account layer2 encapsulation** command.

  Workaround: None. CSCsg58526

- When hard-coded duplex and speed settings are deleted after an interface shuts down, an **a-** is added to the duplex and speed in the output from the **show interface status** command.

  This does not affect performance.

  Workaround: Enter the **no shutdown** command. CSCsg27395

- When a transceiver is removed rapidly from one port and placed in another on the same chassis, occasionally a duplicate seeprom message appears and the port is not able to handle traffic.

  Workaround: Remove the transceiver from the new port and place it in the old port. After the SFP is recognized in the old port, remove it slowly and insert it in the new port. (CSCse34693)

- When performing an ISSU upgrade and the versions of the active and standby supervisor engines differ, you see the following message in the standby supervisor engine console:

  ```
  %XDR-6-XDRINVALIDHDR: XDR for client (CEF push) dropped (slots:2 from slot:3
  context:145 length:11) due to: invalid context
  ```

  Workaround: None. This is an informational message. CSCsi60898

- An IP unnumbered configuration is lost after a switch reloads.

  Workarounds: Do one of the following:

  - After a reload, copy the startup-config to the running-config.
  - Use a loopback interface as the target of the **ip unnumbered** command.
  - Change the CLI configuration so that during bootup the router port is created first.

  CSCsq63051

- In SSO mode, when a port channel is created, deleted, and recreated on an active supervisor engine with the same channel number, the standby port channel state goes out of sync. After a switch over, the following message displays:

  ```
  %PM-4-PORT_INCONSISTENT: STANDBY:Port is inconsistent:
  ```

  Workaround: When the port channel starts to flap, enter **shut** and **no shut** on the port channel. After the first switchover and after deleting the port channel, create a new channel. CSCsr00333

- VTP databases do not propagate through promiscuous trunk ports. If only promiscuous trunks are configured, you will not see the VLAN updates on the other switches in the VTP domain.

  Workaround: Configure an ISL/dot1q trunk port. CSCsu43445

- When you remove a line card containing ports configured with IGMP snooping while booting a standby supervisor engine, the active supervisor engine does not synchronize this configuration to the standby supervisor engine as a part of a bulk synchronization. When you reinstall the line card, the configuration in the active and standby supervisor engines will differ.

  Workaround: Do one of the following:

  - Reload the standby switch again with the line card in place.
  - Remove and reenter the commands on the active supervisor engine. The standby supervisor engine will acquire this change. CSCsv44866

- After posture validation succeeds, the following benign traceback messages may appear after you unconfigure the **global RADIUS** and **IP device tracking** commands:

  ```
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.101   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.102   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  ```

  This applies to classic or E-series Catalyst 4500 supervisor engines running Cisco IOS Release 12.2(50)SG

  Workaround: None. CSCsw14005

- The host's MAC address is not synchronized to the standby supervisor engine after you unconfigure 802.1X on the port and reconnect the host to a IP phone (with CDP port status TLV support) that is connected to the switch.

If the switch were to run a supervisor switchover while in this state, the host's MAC address would not be present in the new active supervisor engine's MAC address table, causing possible connectivity interruption on the host.

Workaround: Enter the **shutdown** command, followed by the **no shutdown** command on the interface. This triggers relearning and synchronizing of the host's MAC to the standby supervisor engine. CSCsw91661

- If you simultaneously apply a service-policy to a port in the output direction and a service-policy to a vlan-range under that port in the output direction, the class-map hit counters in the output of the **show policy-map interface** command are wrong.

  Workaround: None.

  The queue transmit counters as well as the policing statistics (if any) are correct. CSCsz20149

- On a wireless control system (WCS), some device information is incorrectly displayed for PCs sitting behind an lldp-med capable phone. Specifically, WCS displays the phone's serial number, model number, and software version in the PC's device information. All other information about the PC is correctly displayed on WCS.

  This only happens when the switch is running network mobility service protocol (nmsp). It does not happen if the phone is CDP enabled.

  Workaround: Use the VLAN ID or name to differentiate the IP phone and the PC sitting behind the phone on the WCS.

  The IP phone is detected on the voice VLAN, and the displayed information of serial number, model number, and software version is correct. However, a PC sitting behind the phone is detected on a data VLAN, and the displayed device information is wrong and should be ignored.

  CSCsz34522

- When you run Cisco IOS Release 12.2(53)SG1, 12.2(50)SG6, or later releases and configure switchport block multicast on a switch, Layer 2 multicast is not blocked. IPv4 and IPV6 unknown multicast traffic is blocked.

  Prior to Cisco IOS Release 12.2(53)SG1 and 12.2(50)SG6, the switchport block multicast command blocks IP Multicast, Layer 2 multicast, and broadcast traffic. CSCta61825

  Workaround: None CSCtb30327

- If *time* is not specified in the **link debounce** command, the default value depends on the supervisor engine. The default is 10 mS for a Catalyst 4900M switch, Supervisor Engine 6-E, and Supervisor Engine 6L-E. The default is 100 mS for all other supervisor engines.

  Despite the different default value, you can configure any value in the time range.

  Workaround: None. CSCte51948

- On a peer interface on a Catalyst 4948E Ethernet Switch, if errdisabled mode flap detection is set to a very small number (such as 2 flaps in 10 sec), a 10GE link flap may cause the peer interface to enter the errdisabled state.

  Workarounds: The Cisco switch default link-flap detection value is 5 flaps in 10 seconds. Use the default value or larger numbers. CSCtg07677

- After you have enabled EPM logging and the client is authenticated via MAB or Webauth, the value of AUTHTYPE is DOT1X in EPM syslog messages irrespective of the authentication method.

  Similarly, the **show epm sessions** command always displays the authentication method as DOT1X.

  Workaround: To view the authentication method used for a client, enter the **show authentication sessions** command. CSCsx42157

- With CFM enabled globally as well as on an ingress interface, CFM packets received on the interface are not policed with hardware control plane policing.

  Workaround: None. CSCso93282

- When either the RADIUS-server test feature is enabled or RADIUS-server dead-criteria is configured, and either RADIUS-server deadtime is set to 0 or not configured, the RADIUS-server status is not properly relayed to AAA.

  Workaround: Configure both dead-criteria and deadtime.

  ```
  radius-server dead-criteria
  radius-server deadtime
  ```

  CSCtl06706

- When you configure open authentication and perform SSO, the spanning tree state and MAC address are not synchronized to the new standby supervisor engine. This behavior interrupts traffic only after the second switchover because the new standby supervisor engine possesses the wrong state after the initial switchover and the second switchover starts the port in the blocking state.

  Workaround: Enter **shut** and **no shut** on the port to synchronize the STP state. CSCtf52437

- A device in a Guest VLAN that is connected behind a phone capable of 2nd-port-TLV, experiences packet loss following a SSO failover. The device experiences an authentication restart after the first CDP frame arrives from the phone.

  Workaround: None. CSCto46018

- If you reboot a switch, the configured value of the interface MTU size for the elements of the port channel interface does not work for IPv6 traffic.

  Workaround: After the switch reloads, enter **shut** and **no shut** on the port-channel interface.

  CSCto27085

- When you have two Layer 3 CE-facing interfaces, each connected to a CE to split WCCP between the CEs, and you move a WCCP service (such as 60 (ftp-native)) from one interface to the other, the target interface fails to completely transfer the service from the old to the new CE.

  Workaround: Shut down the CE-facing interface. After all of the mask-value entries point to the target CE, unshut the CE-facing interface. CSCtl09941

- Dynamic ACLs do not function correctly if they include advanced operators, including dscp/ipp/tos, log/log-input, fragments and/or tcp flag operators.

  Workaround: Remove these operators from any dynamic ACLs. CSCts05302

- Occasionally, if you use an X2 SR transceiver on a WS-X4706-10GE running Cisco IOS Release 12.2(40)SG, you observe CRC errors after a reload or power cycle upon inserting the card or X2.

  Workaround: Reinsert the X2. CSCsk43618

- If *burst* is not explicitly configured for a single rate policer, the **show policy-map** command displays an incorrect burst value.

  Workaround: Enter the **show policy-map interface** command to find the actual *burst* value programmed. CSCsi71036

- When you enter the **show policy-map vlan** *vlan* command, unconditional marking actions that are configured on the VLAN are not shown.

  Workaround: None.

If you enter the **show policy-map** *name*, however, the unconditional marking actions appear. CSCsi94144

- Uplinks go down when you upgrade the ROMMON of an WS-X45-SUP6-E supervisor from version 0.34 to a later version.

  This behavior occurs in a redundant switch when the active supervisor engine is running Cisco IOS, the standby supervisor engine is in ROMMON, and the standby supervisor engine's ROMMON is upgraded from version 0.34 or to a later version. The upgrade process causes the uplinks on the standby supervisor engine to go down but the active supervisor engine is unaware of this.

  Workarounds: To resume normal operation, do one of the following:

  – Reload both supervisor engines with the **redundancy reload shelf** command.

  – Power-cycle the standby supervisor engine by briefly pulling it from the chassis.

    There is *no* workaround for the link flap issue. CSCsm81875

- Changing the flow control configuration with traffic and pause frames causes some traffic loss.

  This problem can happen when pause frames are sent to a switch port and the flow control receive configuration is toggled on a 10-Gigabit Ethernet port.

  Workaround: Change the flow control receive configuration when no traffic exists. CSCso71647

- If an EtherChannel is a member of a FlexLink pair, then static MAC addresses configured on the EtherChannel are not moved to the alternate port when the EtherChannel fails (FlexLink failure).

  Workaround: None. CSCsq99468

- When a CFM Inward Facing MEP (IFM) is configured on a VLAN that is not allocated on a switch port that is DOWN, the **show ethernet cfm maintenance-points local** command displays the IFM CC Status as inactive. When you allocate the VLAN, the CC-status remains inactive.

  You only see this behavior if you initially did not allocate a VLAN before you configure the IFM, and then later allocate the same VLAN.

  Workaround: Unconfigure, and then reconfigure the IFM on the port.

- When you configure **vlan dot1q tag native** globally on Supervisor Engine 6-E, MST control packets are tagged on egress on the native VLAN. This conflicts with 802.1s. The Cisco 7600 Series router drops its MST proposal agreements (because it expects the native VLAN MST control packets to be untagged), causing 30 seconds of traffic loss while spanning tree converges.

  Workaround: Disable native VLAN tagging on the trunk port of the switch by entering the **no switchport trunk native vlan tag** command. CSCsz12611

- Before large PACLs are fully loaded in hardware, you might observe a false completion messages like the following:

  ```
  Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-HWPROGSUCCESS: Input Security: pacl - now
  fully loaded in hardware *Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-ALLACLINHW: All
  configured ACLs now fully loaded in hardware - hardware switching / QoS restored.
  ```

  Workaround: No functional impact.

  You must wait for the ACLs to be programmed before performing other TCAM related changes. CSCtd57063

- If a large number of VLAN mappings are configured, a member port might fail to join a port channel and no warming is issued.

  Workaround: Reduce the number of VLAN mappings. CSCtn56208

- WCCP service is not reacquired when a service group with a multicast group address is unconfigured, and then reconfigured.

  Workaround: Configure IP multicast routing globally and establish IP PIM sparse dense mode on the CE-facing interface. CSCtl97692

- If an interface whose IP address is being used as the router ID is deleted or shuts down, and you configure a service group with a multicast group address, packet redirection to CE stops and packets are forwarded directly to the destination.

  Workaround: Unconfigure and reconfigure the service group. CSCtn88087

- Global WCCP service configuration fails to enable (WCCP global configuration is accepted but nvgen fails) on a newly deployed switch if the switch is not enabled for SVI or a Layer 3 interface.

  Workaround: Enable a Layer 3 interface in the running configuration. CSCsc88636.

- If you use the **quick** option in the **issu changeversion** command, the following might occur:
  - Links flap for various Layer 3 protocols.
  - A traffic loss of several seconds is observed during the upgrade process.

  Workaround: Do not use the **quick** option with the **issu changeversion** command. CSCto51562

- A peer policy is not updated after reauthentication if the policy is changed on the AS beforehand. After reauthentication, the original peer policy is retained.

  Workaround: Enter **shut** and **no shut** on the port. CSCts29515

- When you enable both Cisco TrustSec and RADIUS accounting, a disparity occurs between the RADIUS client (Cisco switch) and the RADIUS/CTS server in how the authenticator field in the header is computed for DOT1X/RADIUS accounting messages.

  A Cisco IOS AAA client uses the PAC secret to compute the authenticator; Cisco Secure ACS 5.2 uses the shared secret. This behavior causes a mismatch that results in a rejection of the accounting message, and the client marks the server as unresponsive.

  Workaround: None. You must disable 802.1X accounting. CSCts26844

- When more than one Equal Cost Multipath (ECMP) is available on the downstream switch, and Mediatrace is invoked to provide flow statistics, the dynamic policy does not show statistics for a flow.

  Mediatrace cannot find the correct inbound interface and applies the dynamic policy on a different interface from the one used for media flow.

  Workaround: None. CSCts20229

- When a switchover is created on the Mediatrace responder, the dynamic access list created for a monitored flow tuple is not deleted. Although the Mediatrace initiator creates another set of dynamic access lists after the switchover, the old ones remain in the configuration.

  The impact of stale dynamic access lists is to monitor unwanted traffic.

  Workarounds:
  - If the switchover is scheduled, remove the scheduled session on the initiator. Reschedule the session after the new active supervisor engine boots on the responder.
  - If the Mediatrace responder SSO is not planned, after the new active supervisor engine boots, manually delete the stale dynamic access lists. CSCty75070

- Configuring an interface as unidirectional with the **unidirectional send-only | receive-only** command still allows the interface to send (configured as Send-only Unidirection Ethernet mode) or receive (configured as Receive-only Unidirection Ethernet mode) packets in a bidirectional mode.

Workaround: None. CSCtx95359

- When you add a "bfd" suffix to the **snmp server host** *x.x.x.x* configuration command, the BFD traps, ciscoBfdSessUp and ciscoBfdSessDown, are not generated.

  Workaround: Do not specify a "bfd" suffix with the **snmp-server host** *x.x.x.x* configuration command. CSCtx51561

- When you transfer a startup-config to the switch directly without entering **write mem**, and the startup-config contains the **hw-module uplink shared-backplane** command, the four ports on a Supervisor Engine 6-E are not activated in subsequent reloads. The second port of each supervisor engine remains inactive.

  Workaround: Configure **hw-module uplink shared-backplane** from the console or vty, and enter **write mem**. CSCtx43568

- During either a system- or user-initiated reload operation, the following message is observed when the system shuts down:

  ```
  HARDWARE WATCHDOG
  ```

  This message is not observed during a system bootup.

  Workaround: None required. This message is information only. CSCtz15738

- After booting a switch with Cisco IOS XE 3.3.0SG or 3.3.1SG with a crypto (k9) image, a linecard may display a status of Auth Fail, and will not be brought online. Non-crypto images are unaffected.

  Workaround: Reset the linecard either with the **hw-module module** *m* **reset** command or through a manual OIR. CSCuc64146

- Following an upgrade to Cisco IOS XE 3.3.1SG, a switch with a power supply of type PWR-C45-4200ACV may display one of the following messages:

  ```
  %C4K_CHASSIS-3-INSUFFICIENTPOWERSUPPLIESDETECTED: Insufficient power supplies present
  for specified config
  %C4K_CHASSIS-3-MIXINVOLTAGEDETECTED: Power supplies in the chassis are receiving
  different voltage inputs
  %C4K_CHASSIS-3-MIXINPOWERDETECTED: Power supplies in the chassis are of different
  types (AC/DC) or wattage
  ```

  The power supply or power supply inputs are incorrectly listed as 110V when they should be list as 220V. The power supply may go into an err-disable state if only one power supply has the issue. If both power supplies have the issue and are both recognized as 110V, they will not go into an err-disable state. Additionally, other modules in the switch might be denied power and will not power on.

  Workaround: Remove the power supply inputs, remove or reinsert the power supply, then restore the power supply inputs. CSCuc07562

- An ISSU upgrade from Cisco IOS 15.0(2)SG5 to 15.1(1)SG1 fails.

  However, you can perform an upgrade from Cisco IOS 15.0(2)SG5 to 15.1(1)SG2 or from Cisco IOS 15.0(2)SG5 to 15.1(2)SG.

  Workarounds:

  - Use RPR for Cisco IOS 15.0(2)SG5 or 15.1(1)SG1 combinations (upgrade or downgrade).
  - Downgrade from Cisco IOS 15.1(1)SG1; using 15.0(2)SG4 or an earlier release.
  - Upgrade from Cisco IOS 15.0(2)SG5; use 15.1(1)SG2 instead.

  CSCuc54012

- With IGMP snooping enabled, multicast traffic received through a tunnel interface is not forwarded out the Outgoing Interface List.

  Workaround: Disable IGMP snooping. CSCuc65538
- When a port connected to a CDP speaker goes down, a small memory leak occurs (typically less than 300 bytes).

  Workaround: Disable CDP on interfaces that may flap frequently. CSCub85948
- A GLC-GE-100FX pluggable may not operate when used in WS-X4624-SFP-E, WS-X4640-CSFP-E or WS-X4612-SFP-E modules.

  Workaround: None CSCui23911

Resolved Caveats in Cisco IOS Release 15.1(1)SG1

This section lists the resolved caveats in Cisco Release 15.1(1)SG1:

- If a switch enabled with Bidir PIM has a software tunnel interface pointing towards the RP upstream, packet drops are observed.

  Workaround: None. Consider using a physical interface pointing towards RP upstream.

  CSCtz11352
- A switch running Cisco XE 3.3.0SG crashes when you use SPAN.

  Workaround: None. CSCua12869
- If a configuration contains an "ip vrf" or "vrf definition" section, and you type “wr mem” while using an IP Base or LAN Base boot level of IOS-XE, the following message appears.

  Workaround: None. The message is information only. CSCtw93140
- After logging “Authorization succeeded for client (Unknown MAC)” , a switch crashes if the following conditions apply:
  - A switchport is configured with both of the following:

    authentication event server dead action authorize...

    authentication event server alive action reinitalize
  - The RADIUS server was down previously, and a port without traffic (for example: a hub with no devices attached) was authorized into the inaccessible authentication bypass (IAB) VLAN without an associated MAC address.
  - The RADIUS server becomes available again, and a dot1x client attempts to authenticate.

  Workaround: None. CSCtx61557
- Traffic is dropped on a particular tx-queue of an EtherChannel member interfacere configured with a queuing policy. However, it will still appear in an egress span session of the EtherChannel.

  The **show platform software interface tx-queue** command will display an incorrect number of configured queues (compare to EtherChannel members that are not dropping traffic).

  Workaround: Enter shut then no shut on the port. CSCua66962
- If either the active or standby supervisor engine is running Cisco IOS 15.1(1)SG, the standby supervisor engine does achieve a standby-cold or standby-hot state; it continues to reload.

  Workaround: Downgrade or upgrade the supervisor engine by either temporarily removing the other supervisor engine or relocating the supervisor engine to another chassis. CSCtz44577

- On a switch running Cisco 15.0(2)SG4 or 15.1(1)SG with 4648* or 4748* linecards with PoE, a single port on a linecard fails to link up, usually after flapping its link frequently.

  Workaround: Enter **shut** then **no shut** on the port. CSCtz94862

- On a switch running Cisco 15.0(2)SG4 or 15.1(1)SG on 4648* or 4748* linecards with PoE, the PoE device will not power up on a single port, but will work on other ports on the same linecard.

  Workarounds:

  - Connect a non-PoE device to the port
  - Enter shut then no shut on the port. CSCua63562

- The Catalyst 4500E series switch with Supervisor Engine 7L-E contains a denial of service (DoS) vulnerability when processing specially crafted packets that can cause a reload of the device.

  Cisco has released free software updates that address this vulnerability.

  Workarounds that mitigate this vulnerability are not available.

  This advisory is available at the following link:

  http://tools.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20120926-ecc

  CSCty88456

- Cisco IOS Software contains a vulnerability that could allow an unauthenticated, remote attacker to cause a denial of service (DoS) condition. An attacker could exploit this vulnerability by sending a single DHCP packet to or through an affected device, causing the device to reload.

  Cisco has released free software updates that address this vulnerability. A workaround that mitigates this vulnerability is available. This advisory is available at the following link:

  http://tools.cisco.com/security/center/content/CiscoSecurityAdvisory/cisco-sa-20120926-dhcp

  CSCty96049

Open Caveats for Cisco IOS Release 15.1(1)SG

This section lists the open caveats for Cisco IOS Release 15.1(1)SG:

- When you enter the **ip http secure-server** command (or if the system reads it from the startup configuration), the device searches for a persistent self-signed certificate during boot up.

  - If such a certificate does not exist and the device's hostname and default_domain are set, then a persistent self-signed certificate is generated.
  - If such a certificate exists, the FQDN in the certificate is compared with the current device's hostname and default_domain. If either differs from the FQDN in the certificate, the existing persistent self-signed certificate is replaced with a new one with the updated FQDN. Be aware that the existing key pair is used in the new certificate.

  On a switch that supports redundancy, the generation of the self-signed certificate occurs independently on the active and the standby supervisor engines, and the certificates differ. After switchover, the HTTP client that holds the old certificate cannot connect to the HTTPS server.

  Workaround: Reconnect. CSCsb11964

- When policing IEEE 802.1Q tagged non-IP traffic and calculating traffic conformance, the policer excludes the four bytes that constitute the 802.1Q tag even when you enter the **qos account layer2 encapsulation** command.

  Workaround: None. CSCsg58526

- When hard-coded duplex and speed settings are deleted after an interface shuts down, an **a-** is added to the duplex and speed in the output from the **show interface status** command.

  This does not affect performance.

  Workaround: Enter the **no shutdown** command. CSCsg27395
- When a transceiver is removed rapidly from one port and placed in another on the same chassis, occasionally a duplicate seeprom message appears and the port is not able to handle traffic.

  Workaround: Remove the transceiver from the new port and place it in the old port. After the SFP is recognized in the old port, remove it slowly and insert it in the new port. (CSCse34693)
- When performing an ISSU upgrade and the versions of the active and standby supervisor engines differ, you see the following message in the standby supervisor engine console:

  ```
  %XDR-6-XDRINVALIDHDR: XDR for client (CEF push) dropped (slots:2 from slot:3
  context:145 length:11) due to: invalid context
  ```

  Workaround: None. This is an informational message. CSCsi60898
- An IP unnumbered configuration is lost after a switch reloads.

  Workarounds: Do one of the following:

  - After a reload, copy the startup-config to the running-config.
  - Use a loopback interface as the target of the **ip unnumbered** command.
  - Change the CLI configuration so that during bootup the router port is created first.

  CSCsq63051
- In SSO mode, when a port channel is created, deleted, and recreated on an active supervisor engine with the same channel number, the standby port channel state goes out of sync. After a switch over, the following message displays:

  ```
  %PM-4-PORT_INCONSISTENT: STANDBY:Port is inconsistent:
  ```

  Workaround: When the port channel starts to flap, enter **shut** and **no shut** on the port channel. After the first switchover and after deleting the port channel, create a new channel. CSCsr00333
- VTP databases do not propagate through promiscuous trunk ports. If only promiscuous trunks are configured, you will not see the VLAN updates on the other switches in the VTP domain.

  Workaround: Configure an ISL/dot1q trunk port. CSCsu43445
- When you remove a line card containing ports configured with IGMP snooping while booting a standby supervisor engine, the active supervisor engine does not synchronize this configuration to the standby supervisor engine as a part of a bulk synchronization. When you reinstall the line card, the configuration in the active and standby supervisor engines will differ.

  Workaround: Do one of the following:

  - Reload the standby switch again with the line card in place.
  - Remove and reenter the commands on the active supervisor engine. The standby supervisor engine will acquire this change. CSCsv44866
- After posture validation succeeds, the following benign traceback messages may appear after you unconfigure the **global RADIUS** and **IP device tracking** commands:

  ```
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.101   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  %SM-4-BADEVENT: Event 'eouAAAAuthor' is invalid for the current state 'eou_abort':
  eou_auth 4.1.0.102   Traceback= 101D9A88 10B76BB0 10B76FE0 10B7A114 10B7A340 1066A678
  106617F8
  ```

This applies to classic or E-series Catalyst 4500 supervisor engines running
Cisco IOS Release 12.2(50)SG

Workaround: None. CSCsw14005

- The host's MAC address is not synchronized to the standby supervisor engine after you unconfigure 802.1X on the port and reconnect the host to a IP phone (with CDP port status TLV support) that is connected to the switch.

  If the switch were to run a supervisor switchover while in this state, the host's MAC address would not be present in the new active supervisor engine's MAC address table, causing possible connectivity interruption on the host.

  Workaround: Enter the **shutdown** command, followed by the **no shutdown** command on the interface. This triggers relearning and synchronizing of the host's MAC to the standby supervisor engine. CSCsw91661

- If you simultaneously apply a service-policy to a port in the output direction and a service-policy to a vlan-range under that port in the output direction, the class-map hit counters in the output of the **show policy-map interface** command are wrong.

  Workaround: None.

  The queue transmit counters as well as the policing statistics (if any) are correct. CSCsz20149

- On a wireless control system (WCS), some device information is incorrectly displayed for PCs sitting behind an lldp-med capable phone. Specifically, WCS displays the phone's serial number, model number, and software version in the PC's device information. All other information about the PC is correctly displayed on WCS.

  This only happens when the switch is running network mobility service protocol (nmsp). It does not happen if the phone is CDP enabled.

  Workaround: Use the VLAN ID or name to differentiate the IP phone and the PC sitting behind the phone on the WCS.

  The IP phone is detected on the voice VLAN, and the displayed information of serial number, model number, and software version is correct. However, a PC sitting behind the phone is detected on a data VLAN, and the displayed device information is wrong and should be ignored.

  CSCsz34522

- When you run Cisco IOS Release 12.2(53)SG1, 12.2(50)SG6, or later releases and configure switchport block multicast on a switch, Layer 2 multicast is not blocked. IPv4 and IPV6 unknown multicast traffic is blocked.

  Prior to Cisco IOS Release 12.2(53)SG1 and 12.2(50)SG6, the switchport block multicast command blocks IP Multicast, Layer 2 multicast, and broadcast traffic. CSCta61825

  Workaround: None CSCtb30327

- If *time* is not specified in the **link debounce** command, the default value depends on the supervisor engine. The default is 10 mS for a Catalyst 4900M switch, Supervisor Engine 6-E, and Supervisor Engine 6L-E. The default is 100 mS for all other supervisor engines.

  Despite the different default value, you can configure any value in the time range.

  Workaround: None. CSCte51948

- On a peer interface on a Catalyst 4948E Ethernet Switch, if errdisabled mode flap detection is set to a very small number (such as 2 flaps in 10 sec), a 10GE link flap may cause the peer interface to enter the errdisabled state.

Workarounds: The Cisco switch default link-flap detection value is 5 flaps in 10 seconds. Use the default value or larger numbers. CSCtg07677

- After you have enabled EPM logging and the client is authenticated via MAB or Webauth, the value of AUTHTYPE is DOT1X in EPM syslog messages irrespective of the authentication method.

  Similarly, the **show epm sessions** command always displays the authentication method as DOT1X.

  Workaround: To view the authentication method used for a client, enter the **show authentication sessions** command. CSCsx42157

- With CFM enabled globally as well as on an ingress interface, CFM packets received on the interface are not policed with hardware control plane policing.

  Workaround: None. CSCso93282

- When either the RADIUS-server test feature is enabled or RADIUS-server dead-criteria is configured, and either RADIUS-server deadtime is set to 0 or not configured, the RADIUS-server status is not properly relayed to AAA.

  Workaround: Configure both dead-criteria and deadtime.

  ```
  radius-server dead-criteria
  radius-server deadtime
  ```

  CSCtl06706

- When you configure open authentication and perform SSO, the spanning tree state and MAC address are not synchronized to the new standby supervisor engine. This behavior interrupts traffic only after the second switchover because the new standby supervisor engine possesses the wrong state after the initial switchover and the second switchover starts the port in the blocking state.

  Workaround: Enter **shut** and **no shut** on the port to synchronize the STP state. CSCtf52437

- A device in a Guest VLAN that is connected behind a phone capable of 2nd-port-TLV, experiences packet loss following a SSO failover. The device experiences an authentication restart after the first CDP frame arrives from the phone.

  Workaround: None. CSCto46018

- If you reboot a switch, the configured value of the interface MTU size for the elements of the port channel interface does not work for IPv6 traffic.

  Workaround: After the switch reloads, enter **shut** and **no shut** on the port-channel interface.

  CSCto27085

- When you have two Layer 3 CE-facing interfaces, each connected to a CE to split WCCP between the CEs, and you move a WCCP service (such as 60 (ftp-native)) from one interface to the other, the target interface fails to completely transfer the service from the old to the new CE.

  Workaround: Shut down the CE-facing interface. After all of the mask-value entries point to the target CE, unshut the CE-facing interface. CSCtl09941

- Dynamic ACLs do not function correctly if they include advanced operators, including dscp/ipp/tos, log/log-input, fragments and/or tcp flag operators.

  Workaround: Remove these operators from any dynamic ACLs. CSCts05302

- Occasionally, if you use an X2 SR transceiver on a WS-X4706-10GE running Cisco IOS Release 12.2(40)SG, you observe CRC errors after a reload or power cycle upon inserting the card or X2.

  Workaround: Reinsert the X2. CSCsk43618

- If *burst* is not explicitly configured for a single rate policer, the **show policy-map** command displays an incorrect burst value.

  Workaround: Enter the **show policy-map interface** command to find the actual *burst* value programmed. CSCsi71036
- When you enter the **show policy-map vlan** *vlan* command, unconditional marking actions that are configured on the VLAN are not shown.

  Workaround: None.

  If you enter the **show policy**-**map** *name*, however, the unconditional marking actions appear. CSCsi94144
- Uplinks go down when you upgrade the ROMMON of an WS-X45-SUP6-E supervisor from version 0.34 to a later version.

  This behavior occurs in a redundant switch when the active supervisor engine is running Cisco IOS, the standby supervisor engine is in ROMMON, and the standby supervisor engine's ROMMON is upgraded from version 0.34 or to a later version. The upgrade process causes the uplinks on the standby supervisor engine to go down but the active supervisor engine is unaware of this.

  Workarounds: To resume normal operation, do one of the following:
  - Reload both supervisor engines with the **redundancy reload shelf** command.
  - Power-cycle the standby supervisor engine by briefly pulling it from the chassis.

    There is *no* workaround for the link flap issue. CSCsm81875
- Changing the flow control configuration with traffic and pause frames causes some traffic loss.

  This problem can happen when pause frames are sent to a switch port and the flow control receive configuration is toggled on a 10-Gigabit Ethernet port.

  Workaround: Change the flow control receive configuration when no traffic exists. CSCso71647
- If an EtherChannel is a member of a FlexLink pair, then static MAC addresses configured on the EtherChannel are not moved to the alternate port when the EtherChannel fails (FlexLink failure).

  Workaround: None. CSCsq99468
- When a CFM Inward Facing MEP (IFM) is configured on a VLAN that is not allocated on a switch port that is DOWN, the **show ethernet cfm maintenance-points local** command displays the IFM CC Status as inactive. When you allocate the VLAN, the CC-status remains inactive.

  You only see this behavior if you initially did not allocate a VLAN before you configure the IFM, and then later allocate the same VLAN.

  Workaround: Unconfigure, and then reconfigure the IFM on the port.
- When you configure **vlan dot1q tag native** globally on Supervisor Engine 6-E, MST control packets are tagged on egress on the native VLAN. This conflicts with 802.1s. The Cisco 7600 Series router drops its MST proposal agreements (because it expects the native VLAN MST control packets to be untagged), causing 30 seconds of traffic loss while spanning tree converges.

  Workaround: Disable native VLAN tagging on the trunk port of the switch by entering the **no switchport trunk native vlan tag** command. CSCsz12611
- Before large PACLs are fully loaded in hardware, you might observe a false completion messages like the following:

```
Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-HWPROGSUCCESS: Input Security: pacl - now
fully loaded in hardware *Dec  1 18:44:59.926: %C4K_COMMONHWACLMAN-4-ALLACLINHW: All
configured ACLs now fully loaded in hardware - hardware switching / QoS restored.
```

Workaround: No functional impact.

You must wait for the ACLs to be programmed before performing other TCAM related changes. CSCtd57063

- If a large number of VLAN mappings are configured, a member port might fail to join a port channel and no warming is issued.

  Workaround: Reduce the number of VLAN mappings. CSCtn56208

- WCCP service is not reacquired when a service group with a multicast group address is unconfigured, and then reconfigured.

  Workaround: Configure IP multicast routing globally and establish IP PIM sparse dense mode on the CE-facing interface. CSCtl97692

- If an interface whose IP address is being used as the router ID is deleted or shuts down, and you configure a service group with a multicast group address, packet redirection to CE stops and packets are forwarded directly to the destination.

  Workaround: Unconfigure and reconfigure the service group. CSCtn88087

- Global WCCP service configuration fails to enable (WCCP global configuration is accepted but nvgen fails) on a newly deployed switch if the switch is not enabled for SVI or a Layer 3 interface.

  Workaround: Enable a Layer 3 interface in the running configuration. CSCsc88636.

- If you use the **quick** option in the **issu changeversion** command, the following might occur:
  - Links flap for various Layer 3 protocols.
  - A traffic loss of several seconds is observed during the upgrade process.

  Workaround: Do not use the **quick** option with the **issu changeversion** command. CSCto51562

- A peer policy is not updated after reauthentication if the policy is changed on the AS beforehand. After reauthentication, the original peer policy is retained.

  Workaround: Enter **shut** and **no shut** on the port. CSCts29515

- When you enable both Cisco TrustSec and RADIUS accounting, a disparity occurs between the RADIUS client (Cisco switch) and the RADIUS/CTS server in how the authenticator field in the header is computed for DOT1X/RADIUS accounting messages.

  A Cisco IOS AAA client uses the PAC secret to compute the authenticator; Cisco Secure ACS 5.2 uses the shared secret. This behavior causes a mismatch that results in a rejection of the accounting message, and the client marks the server as unresponsive.

  Workaround: None. You must disable 802.1X accounting. CSCts26844

- When more than one Equal Cost Multipath (ECMP) is available on the downstream switch, and Mediatrace is invoked to provide flow statistics, the dynamic policy does not show statistics for a flow.

  Mediatrace cannot find the correct inbound interface and applies the dynamic policy on a different interface from the one used for media flow.

  Workaround: None. CSCts20229

- When a switchover is created on the Mediatrace responder, the dynamic access list created for a monitored flow tuple is not deleted. Although the Mediatrace initiator creates another set of dynamic access lists after the switchover, the old ones remain in the configuration.

  The impact of stale dynamic access lists is to monitor unwanted traffic.

Workarounds:

- If the switchover is scheduled, remove the scheduled session on the initiator. Reschedule the session after the new active supervisor engine boots on the responder.
- If the Mediatrace responder SSO is not planned, after the new active supervisor engine boots, manually delete the stale dynamic access lists. CSCty75070

- Configuring an interface as unidirectional with the **unidirectional send-only | receive-only** command still allows the interface to send (configured as Send-only Unidirection Ethernet mode) or receive (configured as Receive-only Unidirection Ethernet mode) packets in a bidirectional mode.

  Workaround: None. CSCtx95359

- When you add a "bfd" suffix to the **snmp server host** *x.x.x.x* configuration command, the BFD traps, ciscoBfdSessUp and ciscoBfdSessDown, are not generated.

  Workaround: Do not specify a "bfd" suffix with the **snmp-server host** *x.x.x.x* configuration command. CSCtx51561

- When you transfer a startup-config to the switch directly without entering **write mem**, and the startup-config contains the **hw-module uplink shared-backplane** command, the four ports on a Supervisor Engine 6-E are not activated in subsequent reloads. The second port of each supervisor engine remains inactive.

  Workaround: Configure **hw-module uplink shared-backplane** from the console or vty, and enter **write mem**. CSCtx43568

- If a switch enabled with Bidir PIM has a software tunnel interface pointing towards the RP upstream, packet drops are observed.

  Workaround: None. Consider using a physical interface pointing towards RP upstream.

  CSCtz11352

- During either a system- or user-initiated reload operation, the following message is observed when the system shuts down:

  ```
  HARDWARE WATCHDOG
  ```

  This message is not observed during a system bootup.

  Workaround: None required. This message is information only. CSCtz15738

- A switch running Cisco XE 3.3.0SG crashes when you use SPAN.

  Workaround: None. CSCua12869

- If a configuration contains an "ip vrf" or "vrf definition" section, and you type “wr mem” while using an IP Base or LAN Base boot level of IOS-XE, the following message appears.

  Workaround: None. The message is information only. CSCtw93140

- After logging “Authorization succeeded for client (Unknown MAC)” , a switch crashes if the following conditions apply:
  - A switchport is configured with both of the following:

    authentication event server dead action authorize...

    authentication event server alive action reinitalize
  - The RADIUS server was down previously, and a port without traffic (for example: a hub with no devices attached) was authorized into the inaccessible authentication bypass (IAB) VLAN without an associated MAC address.
  - The RADIUS server becomes available again, and a dot1x client attempts to authenticate.

Workaround: None. CSCtx61557

- Traffic is dropped on a particular tx-queue of an EtherChannel member interfacere configured with a queuing policy. However, it will still appear in an egress span session of the EtherChannel.

  The **show platform software interface tx-queue** command will display an incorrect number of configured queues (compare to EtherChannel members that are not dropping traffic).

  Workaround: Enter shut then no shut on the port. CSCua66962
- If either the active or standby supervisor engine is running Cisco IOS 15.1(1)SG, the standby supervisor engine does achieve a standby-cold or standby-hot state; it continues to reload.

  Workaround: Downgrade or upgrade the supervisor engine by either temporarily removing the other supervisor engine or relocating the supervisor engine to another chassis. CSCtz44577
- On a switch running Cisco 15.0(2)SG4 or 15.1(1)SG with 4648* or 4748* linecards with PoE, a single port on a linecard fails to link up, usually after flapping its link frequently.

  Workaround: Enter **shut** then **no shut** on the port. CSCtz94862
- On a switch running Cisco 15.0(2)SG4 or 15.1(1)SG on 4648* or 4748* linecards with PoE, the PoE device will not power up on a single port, but will work on other ports on the same linecard.

  Workarounds:

  - Connect a non-PoE device to the port
  - Enter shut then no shut on the port. CSCua63562
- After booting a switch with Cisco IOS XE 3.3.0SG or 3.3.1SG with a crypto (k9) image, a linecard may display a status of Auth Fail, and will not be brought online. Non-crypto images are unaffected.

  Workaround: Reset the linecard either with the **hw-module module** *m* **reset** command or through a manual OIR. CSCuc64146
- With IGMP snooping enabled, multicast traffic received through a tunnel interface is not forwarded out the Outgoing Interface List.

  Workaround: Disable IGMP snooping. CSCuc65538
- When a port connected to a CDP speaker goes down, a small memory leak occurs (typically less than 300 bytes).

  Workaround: Disable CDP on interfaces that may flap frequently. CSCub85948
- A GLC-GE-100FX pluggable may not operate when used in WS-X4624-SFP-E, WS-X4640-CSFP-E or WS-X4612-SFP-E modules.

  Workaround: None CSCui23911

Resolved Caveats in Cisco IOS Release 15.1(1)SG

This section lists the resolved caveats in Release 15.1(1)SG:

- If you enter the **show spanning-tree vlan** command when spanning tree is changed from PVST to Rapid PVST, the ports configured as promiscuous trunks are not listed as part of the spanning tree.

  Workaround: Enter **shut** and **no shut** on the ports. CSCtn88228
- If you enter the **clear ip mroute ?** command, only the **vrf** option is displayed. The **Hostname** and ' * ' options are not displayed, even though they are accepted by the system. The **clear ip mroute** command functions as expected.

  Workaround: None. CSCto59368

Troubleshooting

These sections provide troubleshooting guidelines for the Catalyst 4000 family running IOS supervisor engines:

- Netbooting from the ROMMON, page 70
- Troubleshooting at the System Level, page 71
- Troubleshooting Modules, page 71
- Troubleshooting MIBs, page 71

Netbooting from the ROMMON

Netbooting using a boot loader image is not supported. Instead, use one of the following options to boot an image:

1. Boot from a CompactFlash card by entering the following command:

```
rommon 1> boot slot0:<bootable_image>
```

2. Use ROMMON TFTP boot.

The ROMMON TFTP boot is very similar to the BOOTLDR TFTP boot, except that:

– the BOOTLDR variable should *not* be set

– the TFTP server must be accessible from the Ethernet management port on the supervisor engine.

To boot from ROMMON, perform the following tasks while in ROMMON mode:

a. Ensure that the Ethernet management port on the supervisor engine is physically connected to the network.

b. Verify that bootloader environment is not set by entering the **unset bootldr** command.

c. Set IP address of the Ethernet management port on the supervisor engine by entering the following command: **set interface fa1** *ip_address*> <*ip_mask*

For example, to set the supervisor engine Ethernet port with an IP address 172.16.1.5 and IP mask 255.255.255.0, enter the following command:

```
rommon 2> set interface fa1 172.16.1.5 255.255.255.0
```

d. Set default gateway for the Ethernet management port on the supervisor engine by entering the following command: **set ip route default** *gateway_ip_address*. The default gateway should be directly connected to the supervisor engine Ethernet management port subnet.

e. Ping the TFTP server to ensure that there is connectivity to the server from the Ethernet management port on the supervisor engine by entering the following command: **ping** <*tftp_server_ip_address*>.

f. Once the ping is successful, boot the image from the TFTP server by entering the following command: **boot tftp://***tftp_server_ip_address*>**/**<*image_path_and_file_name*

For example, to boot the image name cat4000-is-mz.160 located on the TFTP server 172.16.1.8, enter the following command:

```
rommon 3> boot tftp://172.16.1.8/tftpboot/cat4000-is-mz
```

Troubleshooting at the System Level

This section contains troubleshooting guidelines for system-level problems:

- When the system is booting and running power-on diagnostics, do not reset the switch.
- Ensure that you do not mix the serial and Ethernet cables plugged into the supervisor engine. The Fast Ethernet port (10/100 MGT) on the supervisor engine is inoperative in all Catalyst 4500 Cisco IOS releases. An Ethernet cable plugged into the Fast Ethernet port is active only in ROMMON mode.

Troubleshooting Modules

This section contains troubleshooting guidelines for modules:

- When you hot insert a module into a chassis, always use the ejector levers on the front of the module to seat the backplane pins properly. Inserting a module without using the ejector levers might cause the supervisor engine to display incorrect messages about the module. For module installation instructions, refer to the *Catalyst 4500 Series Module Installation Guide*.
- Whenever you connect an interface that has duplex set to autonegotiate to an end station or another networking device, ensure that the other device is configured for autonegotiation as well. If the other device is not set to autonegotiate, the port set to autonegotiate will remain in half-duplex mode, which can cause a duplex mismatch resulting in packet loss, late collisions, and line errors on the link.

Troubleshooting MIBs

For general information on MIBs, RMON groups, and traps, refer to the Cisco public MIB directory (http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml). For information on the specific MIBs supported by the Catalyst 4500 series switches, refer to the Catalyst 4000 MIB Support List located at ftp://ftp.cisco.com/pub/mibs/supportlists/cat4000/cat4000-supportlist.html.

Related Documentation

Although their Release Notes are unique, the 4 platforms (Catalyst 4500, Catalyst 4900, Catalyst ME 4900, and Catalyst 4900M) use the same *Software Configuration Guide*, *Command Reference Guide*, and *System Message Guide*. Refer to the following home pages for additional information:

- Catalyst 4500 Series Switch Documentation Home

  http://www.cisco.com/go/cat4500/docs
- Catalyst 4900 Series Switch Documentation Home

  http://www.cisco.com/go/cat4900/docs
- Cisco ME 4900 Series Ethernet Switches Documentation Home

  http://www.cisco.com/en/US/products/ps7009/tsd_products_support_series_home.html

Hardware Documents

Installation guides and notes including specifications and relevant safety information are available at the following URLs:

- *Catalyst 4500 Series Switches Installation Guide*

  http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/installation/guide/78-14409-08/4500inst.html
- *Catalyst 4500 E-series Switches Installation Guide*

  http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/catalyst4500e/installation/guide/Eseries.html
- For information about individual switching modules and supervisors, refer to the *Catalyst 4500 Series Module Installation Guide* at:

  http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_installation_guides_list.html
- *Regulatory Compliance and Safety Information for the Catalyst 4500 Series Switches*

  http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/hardware/regulatory/compliance/78_13233.html
- Installation notes for specific supervisor engines or for accessory hardware are available at:

  http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_installation_guides_list.html
- Catalyst 4900 and 4900M hardware installation information is available at:

  http://www.cisco.com/en/US/products/ps6021/prod_installation_guides_list.html
- Cisco ME 4900 Series Ethernet Switches installation information is available at:

  http://www.cisco.com/en/US/products/ps7009/prod_installation_guides_list.html

Software Documentation

Software release notes, configuration guides, command references, and system message guides are available at the following URLs:

- Catalyst 4500 release notes are available at:

  http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_release_notes_list.html
- Catalyst 4900 release notes are available at:

  http://www.cisco.com/en/US/products/ps6021/prod_release_notes_list.html
- Cisco ME4900 4900 Series Ethernet Switch release notes are available at:

  http://www.cisco.com/en/US/docs/switches/lan/catalyst4500/release/note/OL_11511.html

Software documents for the Catalyst 4500 Classic, Catalyst 4500 E-Series, Catalyst 4900, and Cisco ME 4900 Series Ethernet Switches are available at the following URLs:

- *Catalyst 4500 Series Software Configuration Guide*

  http://www.cisco.com/en/US/products/hw/switches/ps4324/products_installation_and_configuration_guides_list.html
- *Catalyst 4500 Series Software Command Reference*

  http://www.cisco.com/en/US/products/hw/switches/ps4324/prod_command_reference_list.html

- *Catalyst 4500 Series Software System Message Guide*

  http://www.cisco.com/en/US/products/hw/switches/ps4324/products_system_message_guides_list.html

Cisco IOS Documentation

Platform-independent Cisco IOS documentation may also apply to the Catalyst 4500 and 4900 switches. These documents are available at the following URLs:

- Cisco IOS configuration guides, Release 12.x

  http://www.cisco.com/en/US/products/ps6350/products_installation_and_configuration_guides_list.html
- Cisco IOS command references, Release 12.x

  http://www.cisco.com/en/US/products/ps6350/prod_command_reference_list.html

  You can also use the Command Lookup Tool at:

  http://tools.cisco.com/Support/CLILookup/cltSearchAction.do
- Cisco IOS system messages, version 12.x

  http://www.cisco.com/en/US/products/ps6350/products_system_message_guides_list.html

  You can also use the Error Message Decoder tool at:

  http://www.cisco.com/pcgi-bin/Support/Errordecoder/index.cgi
- For information about MIBs, refer to:

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

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4. If you include any Windows specific code (or a derivative thereof) from the apps directory (application code) you must include an acknowledgement: “This product includes software written by Tim Hudson (tjh@cryptsoft.com)”.

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