Release Notes for the Catalyst 4500E Series Switch, Cisco IOS XE Release 3.1.xSG

IOS XE 3.1.1SG—December 17, 2010

Prior Releases

IOS XE 3.1.0SG

Cisco IOS XE Software Release 3.1.0 SG is a new hardware introduction release delivering primary hardware and software innovations including:

- Support for next-generation Cisco® Catalyst® 4500E Series system Supervisor Engine 7-E and associated line cards
- Deep application and security visibility and policy controls with Flexible NetFlow and Embedded Event Manager (EEM) integration
- Extensible operating system with Cisco IOS XE Software
- Simplified software management and compliance audit with Cisco software activation licensing

This release note describes the features, modifications, and caveats for the Cisco IOS XE 3.1.0 SG software on the Catalyst 4500E series switch with Supervisor Engine 7-E.

Support for Cisco IOS XE Release 3.1.0 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

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

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

Topics include:

Americas Headquarters:
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Cisco IOS XE Software and Naming Conventions

The Cisco Catalyst 4500E Series Switches run Cisco IOS XE software initially introduced on the Cisco ASR 1000 Series Aggregation Services Routers.

The following discussion outlines the format of the Cisco IOS XE Images.

<platform_name>-<bundle_feature_set>.<303_sign_key_version>
<IOS XE_version>.<IOS_image_version>.bin

platform_name—Indicates the name of the platform supported by the IOS XE bundle

bundle_feature set—Indicates the feature set provided by the IOS XE bundle, such as universalk9 or universalk9_lite.

303_sign_key_version—A three character string indicating that the IOS XE bundle is 303ly signed. The meaning of each character is as follows:

First character: Always an 'S', which stands for 303ly signed software.

Second character: 'P' or 'S' denoting a 303ly signed Production (P) or Special (S) IOS XE software bundle. A Production IOS XE bundle is Cisco software approved for general release.A Special IOS XE bundle is development software provided under special conditions for limited use.

Third character: Indicates the key version used to 303ly sign the IOS XE software bundle. A key version is identified by an alphabetical character - for example, A, B or C.

IOS_XE_version—Indicates the bundle's IOS XE release number

IOS_image_version—Indicates the IOS image version of the IOS package contained in the IOS XE bundle.

Example: cat4500e-universalk9.SPA.03.01.00.SG.150-1.XO.bin

For detailed information on Cisco IOS XE, refer to the following URL:

http://www.cisco.com/en/US/products/ps11174/tsd_products_support_series_home.html

Image Categories

Universal_lite image includes two levels of feature sets—LAN Base and IP Base. Anyone with guest access can download the Universal_lite image from cisco.com. If you purchase LAN Base or IP Base, you will receive free software updates.

Universal Image includes three level of feature sets—LAN Base, IP Base, and Enterprise Services. To download the Universal Image, you must have a valid technical support service agreement associated with your Cisco.com user ID. If you purchase a SMARTnet contract, you will receive software updates for all levels of feature sets.

For the software policy applicable for different supervisor engines, refer to the following URL:

http://www.cisco.com/en/US/prod/collateral/switches/ps5718/ps4324/product_bulletin_c25-534149.html

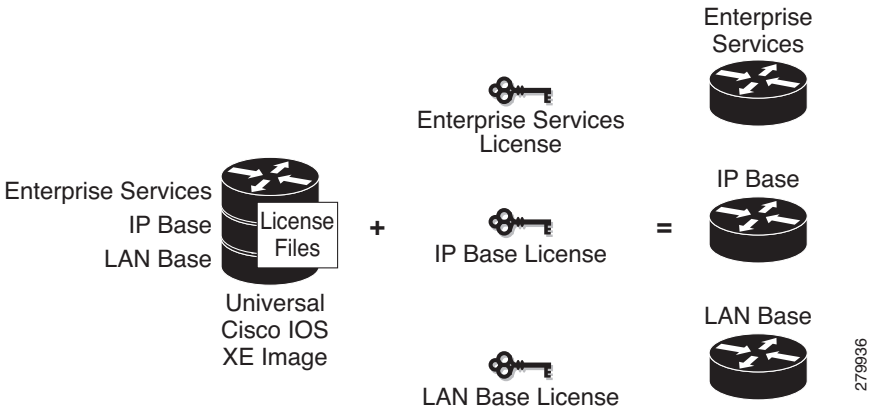
Cisco Software Activation Licensing

Starting with Cisco IOS Software Release 3.1.0 SG, the Catalyst 4500E Supervisor Engine 7-E supports the Cisco software activation licensing solution. This solution is currently implemented on Cisco Catalyst 3750-E and 3560-E Switches and Cisco Integrated Services Routers Generation 2.

As Figure 1 indicates, you can order Cisco Catalyst 4500E Supervisor Engine 7-E with a universal image and different Cisco IOS Software licenses. The software license configures the image with different feature sets (such as IP BASE and Enterprise Services). This arrangement provides you with the following benefits:

- Ease of ordering
  - A single Cisco IOS XE Software Universal image that ships with all Cisco Catalyst 4500E Supervisor Engine 7-E systems
  - Cisco IOS Software enforceable licenses to enable different levels of packages
- Operational simplicity
  - Try and buy
  - Reduced testing
- Services on demand
  - Cisco IOS Software feature upgrades by enabling a new license key, reducing the need for service calls to remote offices

Figure 1 Software Activation with the Universal Cisco IOS XE Software Image



For detailed information on Cisco IOS XE Software Licensing (CiSL), refer to the following:

Cisco IOS Software Activation Configuration Guide

http://www.cisco.com/en/US/docs/ios/csa/configuration/guide/15_1/csa_book.html

Cisco IOS Configuration Fundamentals Command Reference

http://www.cisco.com/en/US/docs/ios/fundamentals/command/reference/cf_book.html

Feature Support by Image Type

Table 1 is a detailed list of features supported on Catalyst 4500E Supervisor Engine 7-E running Cisco IOS Software Release 3.1.0 SG. Please visit Feature Navigator for package details:

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

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
8-Way CEF Load Balancing	Yes	Yes	Yes
10 Gigabit Uplink Use	Yes	Yes	Yes
AAA Server Group	Yes	Yes	Yes
AAA Server Group Based on DNIS	Yes	Yes	Yes
ACL - Improved Merging Algorithm	Yes	Yes	Yes
ACL Logging	Yes	Yes	Yes
ACL Sequence Numbering	Yes	Yes	Yes
Address Resolution Protocol (ARP)	Yes	Yes	Yes
ANSI TIA-1057 LLDP - MED Location Extension	Yes	Yes	Yes
ANSI TIA-1057 LLDP - MED Support	Yes	Yes	Yes
ARP Optimization	Yes	Yes	Yes
Auto QoS	Yes	Yes	Yes
Auto-MDIX	Yes	Yes	Yes
Auto-Voice VLAN (part of Auto QoS)	Yes	Yes	Yes
AutoInstall Using DHCP for LAN Interfaces	Yes	Yes	Yes
AutoQoS - VoIP	Yes	Yes	Yes
AutoRP Enhancement	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
BGP	No	No	Yes
BGP 4	No	No	Yes
BGP 4 Multipath Support	No	No	Yes
BGP 4 Prefix Filter and In-bound Route Maps	No	No	Yes
BGP 4 Soft Config	No	No	Yes
BGP Conditional Route Injection	No	No	Yes
BGP Configuration Using Peer Templates	No	No	Yes
BGP Dynamic Update Peer-Groups	No	No	Yes
BGP Increased Support of Numbered as-path Access Lists to 500	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 Restart Neighbor Session After max-prefix Limit Reached	No	No	Yes
BGP Route-Map Continue	No	No	Yes
BGP Route-Map Continue Support for Outbound Policy	No	No	Yes
BGP Soft Rest	No	No	Yes
Bidirectional PIM	No	Yes	Yes
Boot Config	Yes	Yes	Yes
Broadcast/Multicast Suppression	Yes	Yes	Yes
Call Home	Yes	Yes	Yes
CDP (Cisco Discovery Protocol) Version 2	Yes	Yes	Yes
CDP Enhancement - Host presence TLV	Yes	Yes	Yes
CEF/dCEF - Cisco Express Forwarding	Yes	Yes	Yes
CEFv6 Switching for 6to4 Tunnels	No	Yes	Yes
CEFv6/dCEFv6 - Cisco Express Forwarding	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
CGMP - Cisco Group Management Protocol	No	Yes	Yes
Cisco IOS Scripting w/Tel	Yes	Yes	Yes
Cisco TrustSec SGT Exchange Protocol (SXP) IPv4	No	Yes	Yes
CiscoView Autonomous Device Manager (ADP)	No	Yes	Yes
Class Based Ethernet CoS Matching & Marking (802.1p & ISL CoS)	Yes	Yes	Yes
Class-Based Marking	Yes	Yes	Yes
Class-Based Policing	Yes	Yes	Yes
Class-Based Shaping	Yes	Yes	Yes
Clear Counters Per Port	Yes	Yes	Yes
CLI String Search	Yes	Yes	Yes
CNS	Yes	Yes	Yes
CNS - Configuration Agent	Yes	Yes	Yes
CNS - Event Agent	Yes	Yes	Yes
CNS - Image Agent	Yes	Yes	Yes
CNS - Interactive CLI	Yes	Yes	Yes
CNS Config Retrieve Enhancement with Retry and Interval	Yes	Yes	Yes
Command Scheduler (Kron)	Yes	Yes	Yes
Command Scheduler (Kron) Policy for System Startup	Yes	Yes	Yes
Commented IP Access List Entries	Yes	Yes	Yes
Community Private VLAN	No	Yes	Yes
Config Change Tracking Identifier	Yes	Yes	Yes
Configuration Change Notification and Logging	No	Yes	Yes
Configuration Replace and Configuration Rollback	Yes	Yes	Yes
Configuration Rollback Confirmed Change	Yes	Yes	Yes
Contextual Configuration Diff Utility	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
Control Plane Policing (Copp)	Yes	Yes	Yes
DAI (Dynamic ARP inspection)	Yes	Yes	Yes
DBL (Dynamic Buffer Limiting) - Selective DBL	Yes	Yes	Yes
Debounce Timer per Port	Yes	Yes	Yes
Default Passive Interface	No	Yes	Yes
DHCP - Configurable DHCP Client	Yes	Yes	Yes
DHCP - DHCPv6 Relay Agent notification for Prefix Delegation	Yes	Yes	Yes
DHCP Client	Yes	Yes	Yes
DHCP Option 82, Pass Through	Yes	Yes	Yes
DHCP Server	Yes	Yes	Yes
DHCP Snooping	Yes	Yes	Yes
DHCPv6 - Relay - Reload persistent Interface ID option	Yes	Yes	Yes
DHCPv6 Ethernet Remote ID option	Yes	Yes	Yes
DHCPv6 Repackaging	Yes	Yes	Yes
Dynamic Trunking Protocol (DTP)	Yes	Yes	Yes
EIGRP Stub Routing	No	Yes	Yes
Embedded Event Manager (EEM) 2.0	No	Yes	Yes
Embedded Syslog Manager (ESM)	Yes	Yes	Yes
EnergyWise	Yes	Yes	Yes
Enhanced IGRP (EIGRP)	No	No	Yes
Enhanced PoE Support (Additional Wattage Range)	Yes	Yes	Yes
Entity API for Physical and Logical Mgd Entities	Yes	Yes	Yes
ErrDisable timeout	Yes	Yes	Yes
EtherChannel	Yes	Yes	Yes
EtherChannel - Flexible PAgP	Yes	Yes	Yes
EtherChannel Enhancement - Single Port Channel	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
Fast EtherChannel (FEC)	Yes	Yes	Yes
FHRP - Enhanced Object Tracking of IP SLAs	Yes	Yes	Yes
FHRP - EOT integration with EEM	Yes	Yes	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
Filter-ID Based ACL Application	Yes	Yes	Yes
Microflow policers	No	Yes	Yes
Flexible NetFlow - Ingress support	No	Yes	Yes
Flexible NetFlow - IPv4 Unicast Flows	No	Yes	Yes
Flexible NetFlow - IPv6 Unicast Flows	No	Yes	Yes
Flexible Netflow - Layer 2 Fields	No	Yes	Yes
Flexible NetFlow - NetFlow Export over IPv4	No	Yes	Yes
Flexible NetFlow - NetFlow v9 Export Format	No	Yes	Yes
Flexible NetFlow - Multiple User Defined Caches	No	Yes	Yes
Flexible Netflow - NetflowV5 export protocol	No	Yes	Yes
Flexible NetFlow - Full Flow support	No	Yes	Yes
Embedded Event Manager (EEM) 3.2	No	Yes	Yes
Forced 10/100 Autonegotiation	Yes	Yes	Yes
FTP Support for Downloading Software Images	Yes	Yes	Yes
Gateway Load Balancing Protocol GLBP	No	Yes	Yes
Generic Routing Encapsulation (GRE)	No	Yes	Yes
HSRP - Hot Standby Router Protocol	No	Yes	Yes
HTTP Security	Yes	Yes	Yes
HTTP TACAC+ Accounting support	No	No	Yes
IEEE 802.1ab LLDP (Link Layer Discovery Protocol)	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
IEEE 802.1p Support	Yes	Yes	Yes
IEEE 802.1Q VLAN Trunking	Yes	Yes	Yes
IEEE 802.1s - Multiple Spanning Tree (MST) Standard Compliance	Yes	Yes	Yes
IEEE 802.1s VLAN Multiple Spanning Trees	Yes	Yes	Yes
IEEE 802.1t[1]	Yes	Yes	Yes
IEEE 802.1W Spanning Tree Rapid Reconfiguration	Yes	Yes	Yes
IEEE 802.1x - Auth Fail Open (Critical Ports)	Yes	Yes	Yes
IEEE 802.1x - Auth Fail VLAN	Yes	Yes	Yes
IEEE 802.1X - Flexible Authentication	Yes	Yes	Yes
IEEE 802.1X - Multiple Authentication	Yes	Yes	Yes
IEEE 802.1X - Open Authentication	Yes	Yes	Yes
IEEE 802.1x - VLAN Assignment	Yes	Yes	Yes
IEEE 802.1x - Wake on LAN 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 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 with ACL Assignments	Yes	Yes	Yes
IEEE 802.1X with Port Security	Yes	Yes	Yes
IEEE 802.3ad Link Aggregation (LACP)	Yes	Yes	Yes
IEEE 802.3af PoE (Power over Ethernet)	Yes	Yes	Yes
IEEE 802.3x Flow Control	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
IGMP Fast Leave	Yes	Yes	Yes
IGMP Filtering	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
IGMP Version 3 - Explicit Tracking of Hosts, Groups, and Channels	Yes	Yes	Yes
IGMPv3 Snooping: Full Support	Yes	Yes	Yes
Image Verification	Yes	Yes	Yes
Individual SNMP Trap Support	Yes	Yes	Yes
Inline Power Auto Negotiation	Yes	Yes	Yes
Inline Power Management	Yes	Yes	Yes
Interface Index Persistence	Yes	Yes	Yes
Interface Range Specification	Yes	Yes	Yes
IP Enhanced IGRP Route Authentication	No	No	No
IP Event Dampening	No	Yes	Yes
IP Multicast Load Splitting - Equal Cost Multipath (ECMP) using S, G and Next-hop	No	No	Yes
IP Multicast Load Splitting across Equal-Cost Paths	No	Yes	Yes
IP Named Access Control List	Yes	Yes	Yes
IP over IPv6 Tunnels	No	Yes	Yes
IP Routing	Yes	Yes	Yes
IP SLAs - DHCP Operations	No	No	Yes
IP SLAs - Distribution of Statistics	No	No	Yes
IP SLAs - DNS Operation	No	No	Yes
IP SLAs - FTP Operation	No	No	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
IP SLA - HTTP Operation	No	No	Yes
IP SLAs-ICMP Echo Operation	No	No	Yes
IP SLAs - ICMP Path Echo Operation	No	No	Yes
IP SLAs - Multi Operation Scheduler	No	No	Yes
IP SLAs - One Way Measurement	No	No	No
IP SLAs - Path Jitter Operation	No	No	Yes
IP SLAs - Reaction Threshold	No	No	Yes
IP SLAs - Scheduler	No	No	Yes
IP SLAs - TCP Connect Operation	No	No	Yes
IP SLAs - UDP Based VoIP Operation	No	No	Yes
IP SLAs - UDP Echo Operation	No	No	Yes
IP SLAs - UDP Jitter Operation	No	No	Yes
IP SLAs - VoIP Threshold Traps	No	No	Yes
IP SLAs Random Scheduler	No	No	Yes
IP SLAs Responder	Yes	Yes	Yes
IP SLAs Sub-millisecond Accuracy Improvements	No	No	Yes
IP Summary Address for RIPv2	No	Yes	Yes
IPSG (IP Source Guard)	Yes	Yes	Yes
IPSG (IP Source Guard) for Static Hosts	Yes	Yes	Yes
IPv4 Routing: Static Hosts/Default Gateway	Yes	Yes	Yes
IPv6 (Internet Protocol Version 6)	Yes	Yes	Yes
IPv6 Access Services: DHCPv6 Relay Agent	No	No	Yes
IPv6 BGP	No	No	Yes
IPv6 CNS Agents	Yes	Yes	Yes
IPv6 Config Logger	Yes	Yes	Yes
IPv6 HSRP	No	No	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
IPv6 HTTP(S)	Yes	Yes	Yes
IPv6 IP SLAs (UDP Jitter, UDP Echo, ICMP Echo, TCP Connect)	No	No	Yes
IPv6 MTU Path Discovery	Yes	Yes	Yes
IPv6 Multicast	No	Yes	Yes
IPv6 Multicast: Bootstrap Router (BSR)	No	Yes	Yes
IPv6 Multicast: Explicit Tracking of Receivers	No	Yes	Yes
IPv6 Multicast: MLD Access Group	No	Yes	Yes
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 Embedded RP Support	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 Multicast: RPF Flooding of Bootstrap Router (BSR) Packets	No	Yes	Yes
IPv6 Multicast: Scope Boundaries	No	Yes	Yes
IPv6 Neighbor Discovery	Yes	Yes	Yes
IPv6 Routing - EIGRP Support	No	No	Yes
IPv6 Routing: OSPF for IPv6 (OSPFv3)	No	No	Yes
IPv6 Routing: RIP for IPv6 (RIPng)	No	Yes	Yes
IPv6 Routing: Route Redistribution	No	Yes	Yes
IPv6 Routing: Static Routing	Yes	Yes	Yes
IPv6 Security: Secure Shell SSH support over IPv6	Yes	Yes	Yes
IPv6 Services: AAAA DNS Lookups over an IPv4 Transport	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
IPv6 Services: Cisco Discovery Protocol (CDP) - IPv6 Address Family Support for Neighbor Information	Yes	Yes	Yes
IPv6 Services: DNS Lookups over an IPv6 Transport	Yes	Yes	Yes
IPv6 Services: Extended Access Control Lists	Yes	Yes	Yes
IPv6 Services: Standard Access Control Lists	Yes	Yes	Yes
IPv6 Stateless Auto-configuration	Yes	Yes	Yes
IPv6 Switching: CEF/dCEF Support	No	Yes	Yes
IPv6 Switching: CEFv6 Switched Automatic IPv4-compatible Tunnels	No	Yes	Yes
IPv6 Switching: CEFv6 Switched Configured IPv6 over IPv4 Tunnels	No	Yes	Yes
IPv6 Switching: CEFv6 Switched ISATAP Tunnels	No	Yes	Yes
IPv6 TCL	Yes	Yes	Yes
IPv6 Tunneling: Automatic 6to4 Tunnels	No	Yes	Yes
IPv6 Tunneling: Automatic IPv4-compatible Tunnels	No	Yes	Yes
IPv6 Tunneling: IPv6 over IPv4 GRE Tunnels	No	Yes	Yes
IPv6 Tunneling: ISATAP Tunnel Support	No	Yes	Yes
IPv6 Tunneling: Automatic IPv4-compatible Tunnels	No	Yes	Yes
IPv6 Tunneling: IPv6 over IPv4 GRE Tunnels	No	Yes	Yes
IPv6 Tunneling: ISATAP Tunnel Support	No	Yes	Yes
IPv6 Tunneling: Manually Configured IPv6 over IPv4 Tunnels	No	Yes	Yes
IPv6: Anycast Address	Yes	Yes	Yes
IPv6: ICMPv6	Yes	Yes	Yes
IPv6: ICMPv6 Redirect	Yes	Yes	Yes
IPv6: Neighbor Discovery Duplicate Address Detection	Yes	Yes	Yes
ISSU - ARP	No	Yes	Yes
ISSU - DHCP Snooping	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
ISSU - EtherChannel	No	Yes	Yes
ISSU - HSRP	No	Yes	Yes
ISSU - IEEE 802.1x	No	Yes	Yes
ISSU - IEEE 802.3af (PoE)	No	Yes	Yes
ISSU - IGMP Snooping	No	Yes	Yes
ISSU - IP Host	No	Yes	Yes
ISSU - Port Security	No	Yes	Yes
ISSU - SNMP	No	Yes	Yes
ISSU - STP	No	Yes	Yes
ISSU (IOS In-Service Software Upgrade)	No	Yes	Yes
Jumbo Frames	Yes	Yes	Yes
Layer 2 Traceroute	No	Yes	Yes
Layer 3 Multicast Routing (PIM SM, SSM, Bidir)	No	Yes	Yes
Loadsharing IP packets over more than six parallel paths	Yes	Yes	Yes
Local Proxy ARP	Yes	Yes	Yes
MAB for Voice VLAN	Yes	Yes	Yes
MAC Address Notification	Yes	Yes	Yes
MAC Authentication Bypass	Yes	Yes	Yes
Memory Threshold Notifications	Yes	Yes	Yes
MLD Snooping	Yes	Yes	Yes
Modular QoS CLI (MQC)	Yes	Yes	Yes
Multi-VRF Support (VRF lite)	No	No	No
Multicast BGP (MBGP)	No	Yes	Yes
Multicast Fast Switching Performance Improvement	No	Yes	Yes
Multicast Routing Monitor (MRM)	No	Yes	Yes
Multicast Source Discovery Protocol (MSDP)	No	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
Multicast Subsecond Convergence	No	Yes	Yes
NAC - L2 IEEE 802.1x	Yes	Yes	Yes
NAC - L2 IP	Yes	Yes	Yes
NETCONF over SSHv2	Yes	Yes	Yes
NetFlow	No	Yes	Yes
NetFlow Aggregation	No	Yes	Yes
NetFlow Data Export (NDE) Version 5	No	Yes	Yes
Network Time Protocol (NTP)	Yes	Yes	Yes
Network Time Protocol (NTP) master	Yes	Yes	Yes
No. of VLAN Support	2048	4096	Yes
NSF - BGP	No	No	Yes
NSF - EIGRP	No	No	Yes
NSF - OSPF	No	No	Yes
NSF/SSO (Nonstop Forwarding with Stateful Switchover)	No	Yes	Yes
Onboard Failure Logging	Yes	Yes	Yes
OSPF	No	Yes[2]	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[4]	Yes
OSPF Link State Database Overload Protection	No	Yes[5]	Yes
OSPF Not-So-Stubby Areas (NSSA)	No	Yes[6]	Yes
OSPF Packet Pacing	No	Yes[7]	Yes
OSPF Shortest Paths First Throttling	No	Yes[8]	Yes
OSPF Stub Router Advertisement	No	Yes[9]	Yes
OSPF Support for Fast Hellos	No	Yes[10]	Yes
OSPF Support for Link State Advertisement (LSA) Throttling	No	Yes[11]	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
OSPF Support for Multi-VRF on CE Routers	No	Yes[12]	Yes
OSPF Update Packet-Pacing Configurable Timers	No	Yes[13]	Yes
Per Port Per VLAN Policing	Yes	Yes	Yes
Per-User ACL Support for 802.1X/MAB/Webauth users	Yes	Yes	Yes
PIM Dense Mode State Refresh	No	Yes	Yes
PIM Multicast Scalability	No	Yes	Yes
PIM Version 1	No	Yes	Yes
PIM Version 2	No	Yes	Yes
Policy Routing Infrastructure	No	No	Yes
Policy Based Routing (PBR)	No	No	Yes
Port Security	Yes	Yes	Yes
Port Security on Etherchannel Trunk Port	Yes	Yes	Yes
PowerPC Support	Yes	Yes	Yes
PowerQuicc	Yes	Yes	Yes
Pragmatic General Multicast (PGM)	No	Yes	Yes
Priority Queueing (PQ)	Yes	Yes	Yes
Private VLAN Promiscuous Trunk Port	Yes	Yes	Yes
Private VLAN Trunk Ports	Yes	Yes	Yes
Private VLANs	Yes	Yes	Yes
PVST + (Per VLAN Spanning Tree Plus)	Yes	Yes	Yes
QoS Packet Marking	Yes	Yes	Yes
QoS Priority Percentage CLI Support	Yes	Yes	Yes
RADIUS	Yes	Yes	Yes
RADIUS Attribute 44 (Accounting Session ID) in Access Requests	Yes	Yes	Yes
Rapid PVST+ Dispute Mechanism	Yes	Yes	Yes
Rapid-Per-VLAN-Spanning Tree (Rapid-PVST)	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
Reduced MAC Address Usage	Yes	Yes	Yes
Redundancy Facility Protocol	Yes	Yes	Yes
Remote SPAN (RSPAN)	Yes	Yes	Yes
RIP	No	Yes	Yes
RMON events and alarms	Yes	Yes	Yes
Secure Copy (SCP)	Yes	Yes	Yes
Secure Shell SSH Version 1 Integrated Client	Yes	Yes	Yes
Secure Shell SSH Version 1 Server Support	Yes	Yes	Yes
Secure Shell SSH Version 2 Client Support	Yes	Yes	Yes
Secure Shell SSH Version 2 Server Support	Yes	Yes	Yes
Single Rate 3-Color Marker for Traffic Policing	Yes	Yes	Yes
Smart Port	Yes	Yes	Yes
SNMP (Simple Network Management Protocol)	Yes	Yes	Yes
SNMP Inform Request	Yes	Yes	Yes
SNMP Manager	Yes	Yes	Yes
SNMPv2C	Yes	Yes	Yes
SNMPv3 - 3DES and AES Encryption Support	Yes	Yes	Yes
SNMPv3 (SNMP Version 3)	Yes	Yes	Yes
Source Specific Multicast (SSM)	No	Yes	Yes
Source Specific Multicast (SSM) - IGMPv3,IGMP v3lite, and URD	No	Yes	Yes
Source Specific Multicast (SSM) Mapping	No	Yes	Yes
Span Enhancement: Packet Type and Address Type Filtering	Yes	Yes	Yes
Spanning Tree Protocol (STP)	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Backbone Fast Convergence	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Loop Guard	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
Spanning Tree Protocol (STP) - Portfast	Yes	Yes	Yes
Spanning Tree Protocol (STP) - PortFast BPDU Filtering	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Portfast BPDU Guard	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Portfast Support for Trunks	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Root Guard	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Uplink Fast Convergence	Yes	Yes	Yes
Spanning Tree Protocol (STP) - Uplink Load Balancing	Yes	Yes	Yes
Spanning Tree Protocol (STP) Extension	Yes	Yes	Yes
SSO - HSRP	No	Yes	Yes
SSO - IGMP Snooping	No	Yes	Yes
Standard IP Access List Logging	Yes	Yes	Yes
Standby Supervisor Port Usage	Yes	Yes	Yes
Sticky Port Security	Yes	Yes	Yes
Sticky Port Security on Voice VLAN	Yes	Yes	Yes
Storm Control - Per-Port Multicast Suppression	Yes	Yes	Yes
STP Syslog Messages	Yes	Yes	Yes
Stub IP Multicast Routing	No	Yes	Yes
SVI (Switch Virtual Interface) Autostate Exclude	Yes	Yes	Yes
Switch and IP Phone Security Interaction	Yes	Yes	Yes
Switch Port Analyzer (SPAN)	Yes	Yes	Yes
Switch Port Analyzer (SPAN) - CPU Source	Yes	Yes	Yes
Syslog over IPV6	Yes	Yes	Yes
System Logging - EAL4 Certification Enhancements	No	Yes	Yes
Tacacs SENDAUTH function	Yes	Yes	Yes
Tacacs Single Connection	Yes	Yes	Yes
TACACS+	Yes	Yes	Yes

Table 1 LAN Base/IP Base Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E

Feature	LAN Base	IP Base	Enterprise Services
TCAM4 - Dynamic Multi-Protocol	Yes	Yes	Yes
TCAM4 - Service-Aware Resource Allocation	Yes	Yes	Yes
Time Domain Reflectometry (TDR)	No	Yes	Yes
Time-Based Access Lists	Yes	Yes	Yes
Time-Based Access Lists Using Time Ranges (ACL)	Yes	Yes	Yes
Trusted boundary (extended trust for CDP devices)	Yes	Yes	Yes
UDI - Unique Device Identifier	Yes	Yes	Yes
Uni-Directional Link Routing (UDLR)	No	Yes	Yes
Unicast Mac Filtering	Yes	Yes	Yes
Unicast Reverse Path Forwarding (uRPF)	No	Yes	Yes
Unidirectional Ethernet	Yes	Yes	Yes
UniDirectional Link Detection (UDLD)	Yes	Yes	Yes
Virtual Router Redundancy Protocol (VRRP)	No	Yes	Yes
Virtual Trunking Protocol (VTP) - Pruning	Yes	Yes	Yes
VLAN Access Control List (VACL)	Yes	Yes	Yes
VLAN MAC Address Filtering	Yes	Yes	Yes
VTP (Virtual Trunking Protocol) Version 2	Yes	Yes	Yes
VTP version 3	Yes	Yes	Yes
Web Authentication Proxy	Yes	Yes	Yes
Webauth Enhancements	Yes	Yes	Yes

1. EEE 802.1t—An IEEE amendment to IEEE 802.1D that ncludes extended system ID, long path cost, and PortFast.
2. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
3. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
4. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
5. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
6. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
7. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
8. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
9. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
10. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
11. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.

12. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
13. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.

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

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

Orderable Product Numbers

Table 2 Cisco IOS Software Release 3.1.0 SG Product Numbers and Images

Product Number	Description	Image
S45U-31-01XO	Cisco Catalyst 4500 Supervisor Engine 7-E Cisco IOS Software XE release 3.1.0 SG non-crypto universal image	Cat4500e-universal.SPA.03.01.00.SG.150-1.XO
S45UK9-31-01XO	Cisco Catalyst 4500 Supervisor Engine 7-E Cisco IOS Software XE release 3.1.0 SG crypto universal image	Cat4500e-universalk9.SPA.03.01.00.SG.150-1.XO
C4500E-LIC=	Base product ID for paper delivered software licenses	NA
C4500E-LB	LAN BASE software license (paper delivery)	NA
C4500E-IPB	IP BASE software license (paper delivery)	NA
C4500E-LB-IPB	LAN BASE to IP BASE upgrade license (paper delivery)	NA
C4500E-LB-ES	LAN BASE to Enterprise Services upgrade license (paper delivery)	NA
C4500E-IP-ES	IP BASE to Enterprise Services upgrade license (paper delivery)	NA
C4500E-LIC-PAK	Base product ID for paper delivered software licenses for spare Supervisor Engine 7-E	NA
C4500E-IP-ES-S	IP BASE to Enterprise Services upgrade license for spare Supervisor Engine7-E(paper delivery)	NA
C4500E-IPB-S	IP BASE software license for spare Supervisor Engine 7-E (paper delivery)	NA
L-C4500-LIC=	Base product ID for electronically delivered software licenses	NA
L-C4500E-LB-IP	LAN BASE to IP BASE upgrade license (electronically delivered)	NA

Table 2 Cisco IOS Software Release 3.1.0 SG Product Numbers and Images

Product Number	Description	Image
L-C4500E-IP-ES	IP BASE to Enterprise Services upgrade license (electronically delivered)	NA
L-C4500E-LB-ES	LAN BASE to Enterprise Services upgrade license (electronically delivered)	NA

Support

Support for Cisco IOS Software Release 3.1.0 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 the Catalyst 4500E Series Switch, page 21
- Supported E Series Hardware on Cisco IOS XE Release 3.1.0 SG, page 27
- New and Changed Information, page 28

Supported Hardware on the Catalyst 4500E Series Switch

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

Table 3 Supported Hardware on Cisco Catalyst 4500E Supervisor Engine 7-E

Product Number (append with "=" for spares)	**Product Description**
Supervisor Engines	
WS-X45-Sup7-E	Catalyst 4500E-series switch Supervisor Engine 7-E **Note** This engine is supported on E-series, R-E, and R+E chassis.
10 Gigabit Ethernet Switching Modules	
WS-X4712-SFP+E	12-port 10 Gigabit Ethernet (SFP+) line card Not supported on 4507R-E and 4510R-E chassis.
WS-X4606-X2-E	6-port X2 line card

Table 3 Supported Hardware on Cisco Catalyst 4500E Supervisor Engine 7-E (continued)

Product Number (append with "=" for spares)	**Product Description**
Gigabit Ethernet Switching Modules	
WS-X4302-GB	2-port 1000BASE-X (GBIC) Gigabit Ethernet module
WS-X4306-GB	6-port 1000BASE-X (GBIC) Gigabit Ethernet switching module
WS-X4418-GB	18-port 1000BASE-X (GBIC) Gigabit Ethernet server switching module
WS-X4412-2GB-T	12-port 1000BASE-T Gigabit Ethernet and 2-GBIC ports switching module
WS-X4424-GB-RJ45	24-port 10/100/1000BASE-T Gigabit Ethernet RJ-45 switching module
WS-X4448-GB-LX	48-port 1000BASE-LX (small form-factor pluggable) Gigabit Ethernet fiber optic interface switching module
WS-X4448-GB-RJ45	48-port 10/100/1000BASE-T Gigabit Ethernet switching module
WS-X4448-GB-SFP	48-port 1000BASE-X (small form-factor pluggable) module
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
WS-X4524-GB-RJ45V	24-port 10/100/1000BASE-T RJ-45 Catalyst 4500 series PoE 802.3af
WS-X4548-GB-RJ45	48-port 10/100/1000BASE-T Gigabit Ethernet module
WS-X4548-GB-RJ45V	48-port 10/100/1000BASE-T RJ-45 Catalyst 4500 series PoE 802.3af
WS-X4548-RJ45V+	48-port 10/100/1000 Premium PoE line card
WS-X4612-SFP-E	12-port 1000BASE-X (small form factor pluggable) module with jumbo frame support
WS-X4624-SFP-E	Non-blocking 24-port 1000BASEX (small form factor pluggable) module
WS-X4648-RJ45-E	48 port 10/100/1000BT with 2 to 1 oversubscription and jumbo frame support
WS-X4648-RJ45V-E	48 port 10/100/1000 Mb with 2 to 1 oversubscription PoE 802.3af providing up to 20 Watts power/port
WS-X4648-RJ45V+E	48 port 10/100/1000 Mb with 2 to 1 oversubscription PoE 802.3at providing up to 30 Watts power/port
WS-X4748-RJ45V+E	48-port 10/100/1000 line card nonblocking PoE 802.3at providing up to 30 Watts power/port
Fast Ethernet Switching Modules	
WS-X4124-FX-MT	24-port 100BASE-FX Fast Ethernet MT-RJ multimode fiber switching module
WS-X4148-FX-MT	48-port 100BASE-FX Fast Ethernet MT-RJ multimode fiber switching module
WS-X4148-FE-LX-MT	48-port 100BASE-LX10 Fast Ethernet MT-RJ single-mode fiber switching module
WS-X4148-FE-BD-LC	48-port 100BASE-BX10-D module
WS-X4248-FE-SFP	48-port 100BASE-X SFP switching module
WS-U4504-FX-MT	4-port 100BASE-FX (MT-RF) uplink daughter card
Ethernet/Fast Ethernet (10/100) Switching Modules	
WS-X4124-RJ45	24-port 10/100 RJ-45 module
WS-X4148-RJ	48-port 10/100 RJ-45 switching module
WS-X4148-RJ21	48-port 10/100 4xRJ-21 (telco connector) switching module
WS-X4148-RJ45V	48-port Pre-standard PoE 10/100BASE-T switching module

Table 3 Supported Hardware on Cisco Catalyst 4500E Supervisor Engine 7-E (continued)

Product Number (append with "=" for spares)	**Product Description**
WS-X4224-RJ45V	24-port 10/100BASE-TX RJ-45 Cisco Catalyst 4500 series PoE 802.3af
WS-X4232-GB-RJ	32-port 10/100 Fast Ethernet RJ-45, plus 2-port 1000BASE-X (GBIC) Gigabit Ethernet switching module
WS-X4248-RJ45V	48-port 10/100BASE-T RJ-45 Cisco Catalyst 4500 series PoE 802.3af
WS-X4248-RJ21V	48-port 10/100 Fast Ethernet RJ-21 Cisco Catalyst 4500 series PoE 802.3af telco
WS-X4232-RJ-XX	32-port 10/100 Fast Ethernet RJ-45 modular uplink switching module
Small Form-Factor Pluggable 100 Megabit Ethernet Modules	
GLC-FE-100FX	100BASE-FX, 1310 nm wavelength, 2 km over MMF
GLC-FE-100LX	100BASE-LX, 1310 nm wavelength, 10 km over SMF
GLC-FE-100BX-D	100BASE-BX10-D, 1550 nm TX/1310 nm RX wavelength
GLC-FE-100BX-U	100BASE-BX10-U, 1310 nm TX/1550 nm RX wavelength
Small Form-Factor Pluggable Gigabit Ethernet Modules	
GLC-BX-D	1000BASE-BX10-D small form-factor pluggable module For DOM support, see Table 6 on page 26.
GLC-BX-U	1000BASE-BX10-U small form-factor pluggable module For DOM support, see Table 6 on page 26.bv
GLC-SX-MM	1000BASE-SX small form-factor pluggable module
GLC-LH-SM	1000BASE-LX/LH small form-factor pluggable module
GLC-ZX-SM	1000BASE-ZX small form-factor pluggable module
GLC-T	1000BASE-T small form-factor pluggable module
CWDM-SFP-xxxx	CWDM small form-factor pluggable module (See Table 4 on page 25 for a list of supported wavelengths.) For DOM support, see Table 6 on page 26.
10 Gigabit Ethernet X2 Pluggable Modules	
X2-10GB-LR	10GBASE-LR X2 transceiver module for SMF, 1310-nm wavelength, SC duplex connector
X2-10GB-ER	10GBASE-ER X2 transceiver module for SMF, 1550-nm wavelength, SC duplex connector
X2-10GB-CX4	10GBASE-CX4 X2 transceiver module for CX4 cable, copper, Infiniband 4X connector
X2-10GB-LX4	10GBASE-LX4 X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector
X2-10GB-LRM	10GBASE-LRM X2 transceiver module for MMF, 1310-nm wavelength, SC duplex connector
X2-10GB-SR	10GBASE-SR X2 transceiver module for MMF, 850-nm wavelength, SC duplex connector
X2-10GB-ZR	10GBASE-ZR X2 transceiver module for SMF, 1550 nm wavelength up to 80 km. DOM is not supported.
X2-10GB-DWDM	10GBASE-ZR X2 transceiver module for SMF, 32 nontunable ITU 100-GHz wavelengths up to 80 km are supported. DOM is supported. Dual SC/PC connectors are supported.
CVR-X2-SFP10G	Hot-swappable input/output (I/O) converter module that fits into a 10-Gigabit Ethernet X2 slot on a switch or line card module. Hosts one 10-Gigabit Ethernet SFP+ transceiver module.
SFP+ Modules	

Table 3 Supported Hardware on Cisco Catalyst 4500E Supervisor Engine 7-E (continued)

Product Number (append with "=" for spares)	**Product Description**
SFP-10G-SR	Cisco 10GBASE-SR SFP+ Module for MMF
SFP-10G-LR	Cisco 10GBASE-LR SFP+ Module for SMF
SFP-10G-LRM	Cisco 10GBASE-LRM SFP+ Module for MMF
SFP-H10GB-CU1M	10GBASE-CU SFP+ Cable 1 Meter
SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter
SFP-H10GB-CU5M	10GBASE-CU SFP+ Cable 5 Meter
Gigabit Interface Converter	
WS-G5483=	1000BASE-T GBIC
WS-G5484	1000BASE-SX short wavelength GBIC (multimode only)
WS-G5486	1000BASE-LX/LH long-haul GBIC (single mode or multimode)
WS-G5487	1000BASE-ZX extended reach GBIC (single-handed)
CWDM-GBIC-xxxx	CWDM gigabit interface converter (See Table 4 on page 25 for a list of supported wavelengths.)
DWDM-GBIC-xx.yy	Dense Wavelength-Division Multiplexing ITU 100-Ghz grid 15xx.yy nm GBIC. For DOM support, see Table 6 on page 26.
WDM-GBIC-REC	Receive-only 1000BASE-WDM GBIC
Other Modules	
MEM-X45-2GB-E	SD Card, 2G
USB-X45-4GB-E	USB Thumb Drive, 4G
PWR-C45-1000AC	Catalyst 4500 series switch 1000 Watt AC power supply for chassis 4503, 4506, and 4507R (data only)
PWR-C45-1400DC	Catalyst 4500 series switch 1400 Watt DC triple input power supply (data-only)
PWR-C45-1400DC-P	Catalyst 4500 series switch 1400 Watt DC power supply with integrated PEM
PWR-C45-1400AC	Catalyst 4500 series switch 1400 Watt AC power supply (data-only)
PWR-C45-1300ACV	Catalyst 4500 series switch 1300 Watt AC power supply with integrated voice for chassis 4503, 4506, and 4507R
PWR-C45-2800ACV	Catalyst 4500 series switch 2800 Watt AC power supply with integrated voice (data and PoE) for chassis 4503, 4506, and 4507R
PWR-C45-4200ACV	Catalyst 4500 series switch 4200 Watt AC dual input power supply with integrated voice (data and PoE)
WS-P4502-1PSU	Catalyst 4500 series switch auxiliary power shelf (25-slot), including one PWR-4502
PWR-4502	Catalyst 4500 series switch auxiliary power shelf redundant power supply
PWR-C45-6000ACV	Catalyst 4500 Series Switch 6000 W AC power supply

Table 4 briefly describes the supported CWDM wavelengths in the Catalyst 4500E Series Switch.

Table 4 CWDM GBIC and SFP Supported Wavelengths on Cisco Catalyst 4500E Supervisor Engine 7-E

Product Number (append with "=" for spares)	**Product Description**
CWDM-GBIC (or SFP) -1470	Longwave 1470 nm laser single-mode
CWDM-GBIC (or SFP) -1490	Longwave 1490 nm laser single-mode
CWDM-GBIC (or SFP) -1510	Longwave 1510 nm laser single-mode
CWDM-GBIC (or SFP) -1530	Longwave 1530 nm laser single-mode
CWDM-GBIC (or SFP) -1550	Longwave 1550 nm laser single-mode
CWDM-GBIC (or SFP) -1570	Longwave 1570 nm laser single-mode
CWDM-GBIC (or SFP) -1590	Longwave 1590 nm laser single-mode
CWDM-GBIC (or SFP) -1610	Longwave 1610 nm laser single-mode

Table 5 briefly describes the supported DWDM wavelengths in the Catalyst 4500E Series Switch.

Table 5 DWDM SFP Supported Wavelengths on Cisco Catalyst 4500E Supervisor Engine 7-E

Product Number (append with "=" for spares)	**Product Description**
DWDM-SFP-6061=	Cisco 1000BASE-DWDM SFP 1560.61 nm
DWDM-SFP-5979=	Cisco 1000BASE-DWDM SFP 1559.79 nm
DWDM-SFP-5898=	Cisco 1000BASE-DWDM SFP 1558.98 nm
DWDM-SFP-5817=	Cisco 1000BASE-DWDM SFP 1558.17 nm
DWDM-SFP-5655=	Cisco 1000BASE-DWDM SFP 1556.55 nm
DWDM-SFP-5575=	Cisco 1000BASE-DWDM SFP 1555.75 nm
DWDM-SFP-5413=	Cisco 1000BASE-DWDM SFP 1554.13 nm
DWDM-SFP-5494=	Cisco 1000BASE-DWDM SFP 1554.94 nm
DWDM-SFP-5252=	Cisco 1000BASE-DWDM SFP 1552.52 nm
DWDM-SFP-5172=	Cisco 1000BASE-DWDM SFP 1551.72 nm
DWDM-SFP-5092=	Cisco 1000BASE-DWDM SFP 1550.92 nm
DWDM-SFP-5012=	Cisco 1000BASE-DWDM SFP 1550.12 nm
DWDM-SFP-4851=	Cisco 1000BASE-DWDM SFP 1548.51 nm
DWDM-SFP-4772=	Cisco 1000BASE-DWDM SFP 1547.72 nm
DWDM-SFP-4692=	Cisco 1000BASE-DWDM SFP 1546.92 nm
DWDM-SFP-4612=	Cisco 1000BASE-DWDM SFP 1546.12 nm
DWDM-SFP-4453=	Cisco 1000BASE-DWDM SFP 1544.53 nm
DWDM-SFP-4373=	Cisco 1000BASE-DWDM SFP 1543.73 nm
DWDM-SFP-4694=	Cisco 1000BASE-DWDM SFP 1542.94 nm
DWDM-SFP-4614=	Cisco 1000BASE-DWDM SFP 1542.14 nm

Table 5 DWDM SFP Supported Wavelengths on Cisco Catalyst 4500E Supervisor Engine 7-E

Product Number (append with "=" for spares)	**Product Description**
DWDM-SFP-4056=	Cisco 1000BASE-DWDM SFP 1540.56 nm
DWDM-SFP-3977=	Cisco 1000BASE-DWDM SFP 1539.77 nm
DWDM-SFP-3898=	Cisco 1000BASE-DWDM SFP 1539.98 nm
DWDM-SFP-3819=	Cisco 1000BASE-DWDM SFP 1538.19 nm
DWDM-SFP-3661=	Cisco 1000BASE-DWDM SFP 1536.61 nm
DWDM-SFP-3582=	Cisco 1000BASE-DWDM SFP 1535.82 nm
DWDM-SFP-3504=	Cisco 1000BASE-DWDM SFP 1535.04 nm
DWDM-SFP-3425=	Cisco 1000BASE-DWDM SFP 1534.25 nm
DWDM-SFP-3268=	Cisco 1000BASE-DWDM SFP 1532.68 nm
DWDM-SFP-3190=	Cisco 1000BASE-DWDM SFP 1531.90 nm
DWDM-SFP-3112=	Cisco 1000BASE-DWDM SFP 1531.12 nm
DWDM-SFP-3033=	Cisco 1000BASE-DWDM SFP 1530.33 nm

Table 6 briefly describes the DOM support on the Catalyst 4500E Series Switch.

Table 6 DOM Support on Cisco Catalyst 4500E Supervisor Engine 7-E

SFP	GLC-BX-D
SFP	GLC-BX-U
SFP	CWDM
SFP	DWDM (24 wavelengths)
X2	X2-10GB-LR
X2	X2-10GB-SR
X2	X2-10GB-ER
X2	X2-10GB-LRM
X2	X2-10GB-DWDM
X2	X2-10GB-ZR
SFP+	SFP-10G-SR
SFP+	SFP-10G-LR
SFP+	SFP-10G-LRM

Supported E Series Hardware on Cisco IOS XE Release 3.1.0 SG

Cisco IOS XE Release 3.1.0 SG supports the next-generation high-performance E Series Supervisor Engine 7-E with CenterFlex technology and E-Series line cards and chassis. A brief list of primary E-Series hardware supported by Cisco IOS XE Release 3.1.0 SG is shown in Table 7.

Table 7 Supported E-Series Hardware

Product Number	Description
WS-C4503-E	Cisco Catalyst 4500E Series 3-Slot Chassis • Fan tray • No Power Supply
WS-C4506-E	Cisco Catalyst 4500E Series 6-Slot Chassis • Fan tray • No Power Supply
WS-C4507R-E	Cisco Catalyst 4500E Series 7-Slot Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • In this chassis, supervisor engines must sit in slots 3 and/or 4; the backplane will enforce this restriction.
WS-C4507R+E	Cisco Catalyst 4500E Series 7-Slot 48 GB-ready Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • In this chassis, supervisor engines must sit in slots 3 and/or 4; the backplane will enforce this restriction.
WS-C4510R-E	Cisco Catalyst 4500E Series 10-Slot Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • In this chassis, supervisor engines must sit in slots 5 and/or 6; the backplane will enforce this restriction.
WS-C4510R+E	Cisco Catalyst 4500E Series 10-Slot 48 GB-ready Chassis • Fan tray • No Power Supply • Redundant supervisor engine capability • In this chassis, supervisor engines must sit in slots 5 and/or 6; the backplane will enforce this restriction.

New and Changed Information

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

Note Release IOS-XE 3.1.1 is a rebuild of Release IOS-XE 3.1.0 with only 2 bug fixes included.

New Software Features in Release IOS XE 3.1.1 SG

Release IOS XE 3.1.1 SG provides the following new software on the Catalyst 4500 series switch:

- None

New Hardware Features in Release IOS XE 3.1.1 SG

Release IOS XE 3.1.1 SG provides the following new hardware on the Catalyst 4500 series switch:

- None

New Software Features in Release IOS XE 3.1.0 SG

Release IOS XE 3.1.0 SG provides the following new software on the Catalyst 4500 series switch:

- Flexible Netflow - Netflow v5 Export Protocol

  For information on Flexible Netflow - Netflow v5 Export Protocol, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_de_fnflow_exprts.html
- Flexible Netflow - Multiple User Defined Caches
- Flexible Netflow - Ingress support

  For information on Flexible Netflow - Ingress support, refer to this URL:

  http://www.cisco.com/en/US/docs/ios-xml/ios/fnetflow/configuration/xe-3s/fnf-ingress-vrf.html
- Flexible Netflow - Full Flow support
- Flexible Netflow - NetFlow v9 Export Format

  For information on Flexible Netflow - Full Flow support and NetFlow v9 Export Format, refer to this URL:

  http://www.cisco.com/en/US/docs/ios-xml/ios/fnetflow/configuration/xe-3se/5700/fnf-full-flow.html

  http://www.cisco.com/en/US/docs/ios/ipv6/configuration/guide/ip6-netflow_v9_external_docbase_0900e4b1805b50c8_4container_external_docbase_0900e4b1814cd292.html

- Flexible Netflow - NetFlow Export over IPv4
- Flexible Netflow - IPv4 Unicast Flows

  For information on Flexible Netflow - NetFlow Export over IPv4 and IPv4 Unicast Flows, refer to these URLs:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cust_fnflow_rec_mon.html

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_fnflow_predf_rec.html

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_de_fnflow_exprts.html

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/use_fnflow_redce_cpu.html
- Flexible Netflow - IPv6 Unicast Flows

  For information on Flexible Netflow - IPv6 Unicast Flows, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_de_fnflow_exprts.html
- Flexible Netflow - Layer 2 Fields

  For information on Flexible Netflow - Layer 2 Fields, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cust_fnflow_rec_mon.html

  For 4K-specific implementation details on Flexible NetFlow, refer to Configuring Flexible NetFlow in the *Catalyst 4500E Series Switch Software Configuration Guide*.
- Per Interface NetFlow Data Export

  For information on Per Interface NetFlow Data Export, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cfg_de_fnflow_exprts.html
- Flexible NetFlow - Top N Talkers'

  For information on Flexible NetFlow - Top N Talkers, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fnetflow/configuration/guide/cgf-topn.html
- Microflow Policers
- Flexible NetFlow-based On-box Event Correlation and Policy Actions with EEM
- Digitally Signed Cisco Software

  For information on Digitally Signed Cisco Software, refer to this URL:

  http://www.cisco.com/en/US/docs/ios/fundamentals/configuration/guide/cf_dgtly_sgnd_sw.html

New Hardware Features in Release IOS XE 3.1.0 SG

Release IOS XE 3.1.0 SG provides the following new hardware on the Catalyst 4500 series switch:

Product Number	Description
Supervisor Engine	
WS-X45-Sup7-E	Next generation Catalyst 4500E series switch Supervisor Engine 7-E with 848Gbps system performance (48G/Slot) **Note** This supervisor engine is supported on E-series, R-E, and R+E chassis

Product Number	Description
Line Cards	
WS-X4748-RJ45V+E	48-port 10/100/1000 line card nonblocking PoE 802.3at providing up to 30 Watts power/port
WS-X4712-SFP+E	12-port 10 Gigabit Ethernet (SFP+) line card (48G/Slot capability with 2.5:1 oversubscribed)
WS-X4612-SFP-E	12-port 1000BASE-X (small form factor pluggable) module with jumbo frame support
Chassis	
WS-C4507R+E	Catalyst4500E 7 slot chassis for 48Gbps/slot)
WS-C4510R+E	Catalyst 4500E 10 slot chassis for 48Gbps/slot
SFP+ Optics	
SFP-10G-SR	Cisco 10GBASE-SR SFP+ Module for MMF
SFP-10G-LR	Cisco 10GBASE-LR SFP+ Module for SMF
SFP-10G-LRM	Cisco 10GBASE-LRM SFP+ Module for MMF
SFP-H10GB-CU1M	10GBASE-CU SFP+ Cable 1 Meter
SFP-H10GB-CU3M	10GBASE-CU SFP+ Cable 3 Meter
SFP-H10GB-CU5M	10GBASE-CU SFP+ Cable 5 Meter

Features Not Supported on the Cisco Catalyst 4500E Series Switch

The following features are not supported on a Catalyst 4500E Series Switch with Supervisor Engine 7-E:

- 802.3ah
- ANCP
- Autosmartport
- CBQoS MIB
- Cisco Network Assistant
- Ethernet OAM and CFM
- FlexLink
- HOT Ice
- ID4.1 802.1X User Distribution
- IP4.1 ACL Policy Enhancements
- IP4.1 MAC MOve and Replace
- IP4.1 NEAT
- IP4.1 RADIUS CoA
- IPSG for Static Hosts
- IPUnnumbered

- IPv6 Intf Stats and MIB
- IPv6 PACL and RACL
- IPv6 RA Guard (host mode only)
- IS-IS v4, v6
- Layer 2 Control Packet QoS
- Link Debug
- Link State Tracking
- LLDP MED MIB
- Management Port
- NMSP
- PPPoE
- PVL
- QnQ and L2PT
- REP
- Subsecond UDLD
- SwQoS
- TACACS Aware VRF
- VLAN Translation
- WCCPv2
- Y.1731 (AIS and RDI)

Limitations and Restrictions

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

- The supervisor engine front-panel management port (FastEthernet1 interface) is not supported.
- The WS-X4712-SFP+E module is not supported in the WS-C4507R-E or WS-C4510R-E chassis and does not boot. This module is supported in the WS-C4503-E, WS-C4506-E, WS-C4507R+E, and WS-C4510R+E chassis.
- 802.1q tunneling and related features are not supported.
- More than 16K QoS policies can be configured in software. Only the first 16K are installed in hardware.
- Adjacency learning (through ARP response frames) is restricted to roughly 1000 new adjacencies per second, depending on CPU utilization. This should only impact large networks on the first bootup. After adjacencies are learned they are installed in hardware.
- Multicast fastdrop entries are not created when RPF failure occurs with IPv6 multicast traffic. In a topology where reverse path check failure occurs with IPv6 multicast, this may cause high CPU utilization on the switch.

- The SNMP ceImageFeature object returns a similar feature list for all the three license levels (LAN Base, IP Base, and EntServices). Although the activated feature set for a universal image varies based on the installed feature license, the value displayed by this object is fixed and is not based on the feature license level.
- Standard TFTP implementation limits the maximum size of a file that can be transferred to 32 MB. If ROMMON is used to boot an IOS image that is larger than 32 MB, the TFTP transfer fails at the 65,*xxx* datagram.

  TFTP numbers its datagrams with a 16 bit field, resulting in a maximum of 65,536 datagrams. Because each TFTP datagram is 512 bytes long, the maximum transferable file is 65536 x 512 = 32 MB. If both the TFTP client (ROMMON) and the TFTP server support block number wraparound, no size limitation exists.

  Cisco has modified the TFTP client to support block number wraparound. So, if you encounter a transfer failure, use a TFTP server that supports TFTP block number wraparound. Because most implementations of TFTP support block number wraparound, updating the TFTP daemon should fix the issue.
- 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>
```

CSCtg93278

- 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.
- When sup1 is in ROMMON and sup2 is in IOS, only sup2 can read the SEEPROM contents of the following chassis components:
  - chassis
  - fan-tray
  - clock-module
  - power-supplies
  - mux-buffer for each linecard slot
  - linecards

  On sup1, when the **sprom read ..** command is entered for any of the above components, the SEEPROM contents are displayed as all “0”s.

  When sup1 and sup2 are both in ROMMON (or both in IOS (SSO state)), they can read all SEEPROMs.

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

http://www.cisco.com/en/US/products/products_security_advisories_listing.html

Open Caveats for Cisco IOS XE Release 3.1.1 SG

This section lists the open caveats for Cisco IOS XE Release 3.1.1 SG:

- When you configure EnergyWise power control on PoE ports with a time-based execution schedule, time entry executes without adjusting for daylight savings time.

  Workaround: Manually re-enter all entries with new time settings.

  CSCsy27389

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

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

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

- On a redundant configuration, if a switchover occurs immediately after a port falls back to Webauth from 802.1X or MAB, you may notice that loading the Webauth login page on the browser is delayed.

  Workarounds: Perform a shut and no-shut operation on the link, then flush the IP device tracking table.

  CSCtc99174

- Packet drops are observed on ingress with transmit over-subscription traffic if the packet buffer fills because of deep queues.

  To check whether packet drops are due to a full buffer, enter the **show platform hardware interface stat | include NoPacketBuffAvailCount** command. If the command's output displays a non-zero value or continuously incrementing value, the packet buffer is full.

  Workaround: Configure a QoS policy-map to reduce the queue size and attach that policy to the over-subscribed egress interface.

```
policy-map p1
 class class-default
   queue-limit 16

interface <intf>
 service-policy output p1
```

  To determine the egress interfaces to which policy-map must be attached, enter the **show platform hardware interface** <*interface name*> **tx-queue** command and check the Num Packets column when congestion occurs. If the value is close to the queue Size, the queue is congested and packets are backed up in the transmit queue, holding up packet buffers. If this queue is a deep queue, the out-of-packet-buffer situation can be mitigated by attaching the above policy.

CSCtg64922

- When a large configuration is saved to NVRAM through the **write memory** command, OSPF adjacency goes down and then comes back up if you set hello and dead timer values smaller than the default values.

  Workaround: Use default rather than aggressive timers. CSCtg66784

- The **ip igmp snooping** command is not visible in vlan range mode.

  Workaround: IGMP snooping can still be disabled on VLANs individually. CSCth17903

- When collecting data from the cpmCPUProcessHistoryTable, the data takes a long time to provide and the CPU utilization of the os_info_p process (OS Info provider) increases substantially. The time it takes to do a full walk of an almost fully populated table takes 68 minutes.

  Workaround: None. CSCth42248

- The **show ipv6 access-list** command displays incorrect match counts when multicast traffic is matched to an IPv6 access-list attached to an SVI.

  This problem affects the Cisco Catalyst 4500 Series Supervisor 7E.

  Workaround: None. CSCth65129

- When attaching a existing policy-map (that is already applied to a control-port) to another front-panel port, following message displays:

```
The policymap <policy-map name> is already attached to control-plane and cannot be
shared with other targets.
```

  Workaround: Define a policy-map with a different name and then reattach. CSCti26172

- When you attempt to copy from slaveusb0: or to slaveusb0:, the following message displays:

```
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCC
%Error reading slaveusb0:realtest (Error Sending Request)
```

  Workaround: Avoid remote copying to or from a standby usb0:. Copy from a standby bootflash, or make a local copy directly at the standby bootflash. CSCti29518

- A switch responds slowly, if the number of unique FNF monitors attached to target exceeds 2048, one per target.

  Workarounds:

  - Decrease the number of monitors.
  - Attach the same monitor to multiple targets.

  CSCti43798

- On all redundant configurations, RF Switchover History time is incorrect when accessed through the cRFHistorySwactTime.

  Workaround: Use the show redundancy and show redundancy states commands to retrieve the switchover history times. CSCti53834

- When you enter the **show access-list** command, the hit counts for the ACEs in some access-lists are not updated.

  Workaround: None. CSCti54065

- On all redundant configurations, SNMP operations to obtain Redundancy Switchover history using cRFHistoryTable fail, returning “NO_SUCH_INSTANCE_EXCEPTION.”

Workaround: Enter the **show redundancy switchover history** command to obtain redundancy switchover history. CSCti55424

- CISCO-IETF-IP-MIB and CISCO-IETF-IP-FORWARD-MIB are not supported in Cisco IOS XE 3.1.0 SG.

  Workaround: None. CSCti64725

- ciscoFlashPartitionFileCount object returns an incorrect file count for bootflash:, usb0:, slot0:, slaveslot0:, slavebootflash:, and slaveusb0:.

  Workaround: Use the **dir** [*device*] command to obtain the correct file count. Example: **dir bootflash:** CSCti74130

- When you try to copy to slaveusb0: from the active bootflash, the following message displays:

```
%Error writing slaveusb0:/cat4500e-universalk9-lite.SSA.0.DEV-0.0.DEV-0.bin (Error
Sending Request)
 *Jul 30 11:38:58.890 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
*Jul 30 11:39:14.169 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
 *Jul 30 11:39:29.625 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
```

  Workaround: Remove, reinsert the slaveusb0:, and recopy. CSCti19321

- 3-5 minutes after you create a GRE tunnel between interfaces on two switches (first hop and last hop), you observe that the FHR begins to drop the tunnel traffic. This causes the (S,G) entry, originally created on the LHR when sending IPv6 source traffic, to time out.

  Workaround: Enter **shut**, then **no shut** on the host port interface of the first hop. CSCti44397

- If you are using a large custom Webauth login page on a switch running Cisco IOS Release 12.2(53)SG3 or IOS-XE 3.1.0 SG and multiple user are trying to access custom HTML pages, the switch might reload.

  Workaround: Unconfigure the customized HTML page to use default internal Webauth pages and reload the switch after changing the configuration. CSCti81874

- If multicast is configured, at least 10K groups and roughly 20K mroutes exist, and IGMP Joins with source traffic transit to all the multicast groups, and you make changes to the configuration, Traceback and CPUHOG messages are displayed.

  This is caused by the large number of updates generating SPI messages that must be processed by the CPU to ensure that the platform is updated with the changes in all the entries.

  Workaround: None. CSCti20312

- One or more line cards (WS-X46xx and WS-X47xx series) stop responding to interface changes when near-simultaneous link events (if timed correctly) occur on the same linecard.

  Only line cards in the WS-X46xx series and the WS-X47xx series are affected. Interfaces that are already linked-up are not affected.

  Workaround: Eliminate link flap. If the problem exists, do one of the following:

  - Reload the linecard module with the **hw-module module** *n* **reset** command.
  - For dual supervisor engines, perform a switchover. CSCts67025

- Frequent link flap can trigger a failure that causes control plane latency until the switch is reloaded. After the issue is triggered, normal traffic is forwarded without drops, but pings to or from the switch drop, and new connections to linecards come up slowly or not at all. The following error messages appear:

```
C4K_WATCHDOG-3-CHILDFAILURE:
C4K_LINECARD-3-INTERRUPTDELAYED:
C4K_LINECARD-3-INTERRUPTCOMPLETED:
```

Workaround: Eliminate link flap.

Provide temporary remediation with a forced supervisor engine switchover. CSCtt06131

- After booting a switch with Supervisor Engine 7-E, you observe two versions of incorrect up time when using **show version** or **show redundancy**:

  Scenario #1: Display 136 years, 10 weeks, 6 hours, 26 minutes

```
Current Processor Information :
-------------------------------

Active Location = slot 5
        Current Software state = ACTIVE
       Uptime in current state = 136 years, 10 weeks, 6 hours, 26 minutes
                 Image Version = Cisco IOS Software, IOS-XE Software, Catalyst 4500 L3
Switch Software (cat4500e-UNIVERSALK9-M), Version 03.01.01.SG RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 14-Dec-10 22:12 by prod
               BOOT = bootflash:cat4500e-universalk9.SPA.03.01.01.SG.150-1.XO1.bin,1;
        Configuration register = 0x2102
```

  Scenario #2: Display “0 minute” after being up for a few days

```
Current Processor Information :
-------------------------------
               Active Location = slot 6
        Current Software state = ACTIVE
       Uptime in current state = 0 minute
                 Image Version = Cisco IOS Software, IOS-XE Software, Catalyst 4500 L3
Switch Software (cat4500e-UNIVERSALK9-M), Version 03.01.01.SG RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 14-Dec-10 22:12 by prod
               BOOT = bootflash:cat4500e-universalk9.SPA.03.01.01.SG.150-1.XO1.bin,1;
        Configuration register = 0x2102
```

  Workaround: None. CSCtr54218

- Occasionally, when an interface with a QoS policy changes speed or when a QoS policy is being programmed on an interface, a Supervisor Engine 7 might unexpectedly encounter an FFM crash.

  Workaround: None. CSCtn81726

- Rarely, an FFM crash may occur when control plane queues are slow to empty.

  Workaround: None. CSCtr07852

- If you perform an OIR on a linecard, several %C4K_RKNOVA-4-INVALIDTOKENEXPIRED messages appear in the logs.

  Workaround: None. CSCtu37959

- A crash may occur when the switch CPU is joined to the session announcement group.

  Workaround: Configure neither **ip sap listen** nor **ip igmp join-group 224.2.127.254**. CSCtr28857

- Following a route flap, a Supervisor Engine 7-E running Cisco IOS XE Release 3.1.0XO or 3.1.1SG crashes and generates an FFM crashinfo file.

  Workaround: None. Upgrade to Cisco IOS XE Release 3.2.0SG or higher. CSCtr54723

- On a redundant system consisting of supervisor engines 6-E and 7-E, when the system consumes considerable memory (for example, with heavy multicast traffic), a crash may occur. This event is due to a memory mismatch between the two supervisor engines.

  Workaround: Upgrade the memory of Supervisor Engine 6-E to match that of Supervisor Engine 7-E.

Resolved Caveats for Cisco IOS XE Release 3.1.1 SG

This section lists the resolved caveats for Cisco IOS XE Release 3.1.1 SG:

- When a 4948E uplink or 4712-SFP+E card is used with a SFP and is connected to a peer that does not have auto negotiate, the link will not boot with "speed nonegotiate" configured.

  The issue occurs in Releases IOS-XE 3.1.0SG, 12.2(54)XO, and 12.2(54)SG.

  Workaround: Use auto negotiation.

  Issue resolved in Releases 12.2(54)WO and 15.0(2)SG. CSCtj90069

- Upon a SSO switchover, traffic is interrupted for roughly 4 seconds on WS-X4712-SFP+E 10 Gigabit Ethernet links and for roughly 350 millisecond on WS-X45-SUP7-E 10 Gigabit Ethernet links.

  Workaround: If system or interface MTU is configured to a non-default value, traffic loss on a SSO switchover is below 200 milliseconds. CSCtj21079

Open Caveats for Cisco IOS XE Release 3.1.0 SG

This section lists the open caveats for Cisco IOS XE Release 3.1.0 SG:

- Upon a SSO switchover, traffic is interrupted for roughly 4 seconds on WS-X4712-SFP+E 10 Gigabit Ethernet links and for roughly 350 ms on WS-X45-SUP7-E 10 Gigabit Ethernet links.

  Workaround: Configure a system or interface MTU to a non-default value. Doing this reduces traffic loss on SSO switchovers to less than 200 ms.

  CSCtj21079

- When you configure EnergyWise power control on PoE ports with a time-based execution schedule, time entry executes without adjusting for daylight savings time.

  Workaround: Manually re-enter all entries with new time settings.

  CSCsy27389

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

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

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

- On a redundant configuration, if a switchover occurs immediately after a port falls back to Webauth from 802.1X or MAB, you may notice that loading the Webauth login page on the browser is delayed.

  Workarounds: Perform a shut and no-shut operation on the link, then flush the IP device tracking table.

  CSCtc99174

- Packet drops are observed on ingress with transmit over-subscription traffic if the packet buffer fills because of deep queues.

  To check whether packet drops are due to a full buffer, enter the **show platform hardware interface stat | include NoPacketBuffAvailCount** command. If the command's output displays a non-zero value or continuously incrementing value, the packet buffer is full.

  Workaround: Configure a QoS policy-map to reduce the queue size and attach that policy to the over-subscribed egress interface.

```
policy-map p1
 class class-default
   queue-limit 16

interface <intf>
 service-policy output p1
```

  To determine the egress interfaces to which policy-map must be attached, enter the **show platform hardware interface** <*interface name*> **tx-queue** command and check the Num Packets column when congestion occurs. If the value is close to the queue Size, the queue is congested and packets are backed up in the transmit queue, holding up packet buffers. If this queue is a deep queue, the out-of-packet-buffer situation can be mitigated by attaching the above policy.

  CSCtg64922

- When a large configuration is saved to NVRAM through the **write memory** command, OSPF adjacency goes down and then comes back up if you set hello and dead timer values smaller than the default values.

  Workaround: Use default rather than aggressive timers. CSCtg66784

- The **ip igmp snooping** command is not visible in vlan range mode.

  Workaround: IGMP snooping can still be disabled on VLANs individually. CSCth17903

- When collecting data from the cpmCPUProcessHistoryTable, the data takes a long time to provide and the CPU utilization of the os_info_p process (OS Info provider) increases substantially. The time it takes to do a full walk of an almost fully populated table takes 68 minutes.

  Workaround: None. CSCth42248

- The **show ipv6 access-list** command displays incorrect match counts when multicast traffic is matched to an IPv6 access-list attached to an SVI.

  This problem affects the Cisco Catalyst 4500 Series Supervisor 7E.

  Workaround: None. CSCth65129

- When attaching a existing policy-map (that is already applied to a control-port) to another front-panel port, following message displays:

```
The policymap <policy-map name> is already attached to control-plane and cannot be
shared with other targets.
```

  Workaround: Define a policy-map with a different name and then reattach. CSCti26172

- When you attempt to copy from slaveusb0: or to slaveusb0:, the following message displays:

```
Copy in
progress...CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
CCCCCCCCCCCCCC
%Error reading slaveusb0:realtest (Error Sending Request)
```

  Workaround: Avoid remote copying to or from a standby usb0:. Copy from a standby bootflash, or make a local copy directly at the standby bootflash. CSCti29518

- A switch responds slowly, if the number of unique FNF monitors attached to target exceeds 2048, one per target.

  Workarounds:

  - Decrease the number of monitors.
  - Attach the same monitor to multiple targets.

  CSCti43798

- On all redundant configurations, RF Switchover History time is incorrect when accessed through the cRFHistorySwactTime.

  Workaround: Use the show redundancy and show redundancy states commands to retrieve the switchover history times. CSCti53834

- When you enter the **show access-list** command, the hit counts for the ACEs in some access-lists are not updated.

  Workaround: None. CSCti54065

- On all redundant configurations, SNMP operations to obtain Redundancy Switchover history using cRFHistoryTable fail, returning "NO_SUCH_INSTANCE_EXCEPTION."

  Workaround: Enter the **show redundancy switchover history** command to obtain redundancy switchover history. CSCti55424

- CISCO-IETF-IP-MIB and CISCO-IETF-IP-FORWARD-MIB are not supported in Cisco IOS XE 3.1.0 SG.

  Workaround: None. CSCti64725

- ciscoFlashPartitionFileCount object returns an incorrect file count for bootflash:, usb0:, slot0:, slaveslot0:, slavebootflash:, and slaveusb0:.

  Workaround: Use the **dir** [*device*] command to obtain the correct file count. Example: **dir bootflash:** CSCti74130

- When you try to copy to slaveusb0: from the active bootflash, the following message displays:

```
%Error writing slaveusb0:/cat4500e-universalk9-lite.SSA.0.DEV-0.0.DEV-0.bin (Error
Sending Request)
 *Jul 30 11:38:58.890 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
*Jul 30 11:39:14.169 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
 *Jul 30 11:39:29.625 UTC: %IOSXE-3-PLATFORM: STANDBY:4 kernel: usb 1-2: device
descriptor read/64, error -110
```

  Workaround: Remove, reinsert the slaveusb0:, and recopy. CSCti19321

- 3-5 minutes after you create a GRE tunnel between interfaces on two switches (first hop and last hop), you observe that the FHR begins to drop the tunnel traffic. This causes the (S,G) entry, originally created on the LHR when sending IPv6 source traffic, to time out.

  Workaround: Enter **shut**, then **no shut** on the host port interface of the first hop. CSCti44397

- If you are using a large custom Webauth login page on a switch running Cisco IOS Release 12.2(53)SG3 or IOS-XE 3.1.0 SG and multiple user are trying to access custom HTML pages, the switch might reload.

  Workaround: Unconfigure the customized HTML page to use default internal Webauth pages and reload the switch after changing the configuration. CSCti81874

- If multicast is configured, at least 10K groups and roughly 20K mroutes exist, and IGMP Joins with source traffic transit to all the multicast groups, and you make changes to the configuration, Traceback and CPUHOG messages are displayed.

  This is caused by the large number of updates generating SPI messages that must be processed by the CPU to ensure that the platform is updated with the changes in all the entries.

  Workaround: None. CSCti20312

- One or more line cards (WS-X46xx and WS-X47xx series) stop responding to interface changes when near-simultaneous link events (if timed correctly) occur on the same linecard.

  Only line cards in the WS-X46xx series and the WS-X47xx series are affected. Interfaces that are already linked-up are not affected.

  Workaround: Eliminate link flap. If the problem exists, do one of the following:

  – Reload the linecard module with the **hw-module module** *n* **reset** command.

  – For dual supervisor engines, perform a switchover. CSCts67025

- Frequent link flap can trigger a failure that causes control plane latency until the switch is reloaded. After the issue is triggered, normal traffic is forwarded without drops, but pings to or from the switch drop, and new connections to linecards come up slowly or not at all. The following error messages appear:

```
C4K_WATCHDOG-3-CHILDFAILURE:
C4K_LINECARD-3-INTERRUPTDELAYED:
C4K_LINECARD-3-INTERRUPTCOMPLETED:
```

  Workaround: Eliminate link flap.

  Provide temporary remediation with a forced supervisor engine switchover. CSCtt06131

- After booting a switch with Supervisor Engine 7-E, you observe two versions of incorrect up time when using **show version** or **show redundancy**:

  Scenario #1: Display 136 years, 10 weeks, 6 hours, 26 minutes

```
Current Processor Information :
-------------------------------

Active Location = slot 5
        Current Software state = ACTIVE
       Uptime in current state = 136 years, 10 weeks, 6 hours, 26 minutes
                 Image Version = Cisco IOS Software, IOS-XE Software, Catalyst 4500 L3
Switch Software (cat4500e-UNIVERSALK9-M), Version 03.01.01.SG RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 14-Dec-10 22:12 by prod
               BOOT = bootflash:cat4500e-universalk9.SPA.03.01.01.SG.150-1.XO1.bin,1;
        Configuration register = 0x2102
```

  Scenario #2: Display “0 minute” after being up for a few days

```
Current Processor Information :
-------------------------------
               Active Location = slot 6
        Current Software state = ACTIVE
       Uptime in current state = 0 minute
                 Image Version = Cisco IOS Software, IOS-XE Software, Catalyst 4500 L3
Switch Software (cat4500e-UNIVERSALK9-M), Version 03.01.01.SG RELEASE SOFTWARE (fc1)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2010 by Cisco Systems, Inc.
Compiled Tue 14-Dec-10 22:12 by prod
               BOOT = bootflash:cat4500e-universalk9.SPA.03.01.01.SG.150-1.XO1.bin,1;
```

```
Configuration register = 0x2102
```

Workaround: None. CSCtr54218

- Occasionally, when an interface with a QoS policy changes speed or when a QoS policy is being programmed on an interface, a Supervisor Engine 7 might unexpectedly encounter an FFM crash.

  Workaround: None. CSCtn81726

- Rarely, an FFM crash may occur when control plane queues are slow to empty.

  Workaround: None. CSCtr07852

- If you perform an OIR on a linecard, several %C4K_RKNOVA-4-INVALIDTOKENEXPIRED messages appear in the logs.

  Workaround: None. CSCtu37959

- A crash may occur when the switch CPU is joined to the session announcement group.

  Workaround: Configure neither **ip sap listen** nor **ip igmp join-group 224.2.127.254**. CSCtr28857

- Following a route flap, a Supervisor Engine 7-E running Cisco IOS XE Release 3.1.0XO or 3.1.1SG crashes and generates an FFM crashinfo file.

  Workaround: None. Upgrade to Cisco IOS XE Release 3.2.0SG or higher. CSCtr54723

- On a redundant system consisting of supervisor engines 6-E and 7-E, when the system consumes considerable memory (for example, with heavy multicast traffic), a crash may occur. This event is due to a memory mismatch between the two supervisor engines.

  Workaround: Upgrade the memory of Supervisor Engine 6-E to match that of Supervisor Engine 7-E.

Troubleshooting

These sections provide troubleshooting guidelines for the Catalyst 4500 series switches running IOS supervisor engines:

Netbooting from ROMMON

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

1. Boot from an SD 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 Cisco IOS XE image cat4500e-universalk9.03.01.00 .SG.150-1.XO.bin located on the TFTP server 172.16.1.8, enter the following command:

   ```
   rommon 3> boot tftp://172.16.1.8/tftpboot/cat4500e-universalk9.03.01.00
   .SG.150-1.XO.bin
   ```

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. 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.

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Release Notes for the Catalyst 4500E Series Switch, Cisco Release IOS XE 3.1.0 SG