



Release Notes for the Catalyst 4500-E Series Switch, Cisco IOS XE Release 3.7.xE

Current release
IOS XE 3.7.3E—January 15, 2016

Previous releases
IOS XE 3.7.2E, IOS XE 3.7.1E, IOS XE 3.7.0E

This release note describes the features, modifications, and caveats for the Cisco IOS XE 3.7.0E software on the Catalyst 4500E series switch with Supervisor Engine 7-E, 7L-E, and 8-E.



Note

For the Supervisor Engine 8-E to support IOS XE 3.7.0E, the ROMMON version must be upgraded to 15.1(1r)SG5. (Refer to [Upgrading the System Software, page 44](#)).

Cisco IOS XE 3.7.0E is a feature rich new software feature release for IOS and IOS-XE based Catalyst Access Switching products (Cat4500E/X, 3850/3650, 3K-X, Cat2K and 2K/3K Compact switches) which brings new innovations for Converged Access in wired and wireless topologies, IT Simplicity, Application Experience, and Mobility. This release will provide standard maintenance.

Support for Cisco IOS XE Release 3.7.0E 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/en/US/products/hw/switches/ps4324/index.html>



Note

Although this release note and those for the Catalyst 4900M, Catalyst 4948E, Catalyst 4948E-F Series Switches, Catalyst 4500 Series Switches, and the Catalyst 4500-X Series Switches differ, each leverages the same *Software Configuration Guide*, *Command Reference Guide*, and *System Message Guide*.

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

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Cisco IOS Software Packaging

The Enterprise Services image supports all Cisco Catalyst 4500E Series software features based on Cisco IOS Software, including enhanced routing.

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), Full OSPF, Full Enhanced Interior Gateway Routing Protocol (EIGRP) & Virtual Routing Forwarding (VRF-lite).

The LAN Base image complements the existing IP Base and Enterprise Services images. It is focused on customer access and Layer 2 requirements and therefore many of the IP Base features are not required.

Starting with Cisco IOS Release XE 3.5.0E, OSPF Routed Access in IP Base support rose to 1000 routes.

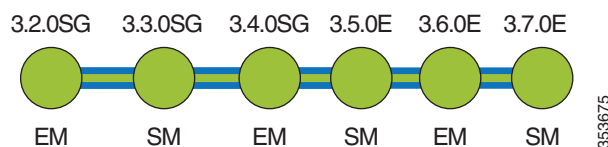
Cisco XE Release Strategy

Customers with Catalyst 4500 Series Switches who need the latest hardware and software features should migrate to Cisco IOS Release XE 3.7.0E.

IOS XE 3.2.xSG is an active maintenance train that supports Sup7E only. IOS XE 3.4.xSG is a maintenance train supporting Sup7E and Sup7L-E. IOS XE 3.6.xSG is a maintenance train supporting Sup7E, Sup7L-E and Sup8-E. IOS XE 3.6.xE, 3.4.xSG, and 3.2.xSG are extended maintenance (EM) releases. IOS XE 3.5.xE and 3.3.0SG are standard releases (SM).

Figure 1 displays the release strategy.

Figure 1 Software Release Strategy for the Catalyst 4500E Series Switch



Support

Support for Cisco IOS Software Release XE 3.7.0E 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 3](#)
- [Supported E-Series Hardware on Cisco IOS XE Release 3.7.xE, page 6](#)
- [Feature Support by Image Type, page 7](#)
- [OpenFlow Version and Cisco IOS Release Support, page 29](#)
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- [Orderable Product Numbers, page 31](#)



Note

For information about wireless web UI requirements, see [“Wireless Web UI Software Requirements” section on page 38](#)

Supported Hardware on the Catalyst 4500E Series Switch

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[Table 2 Supported Pluggable Transceiver Modules, page 5](#)

[Table 3 Power over Ethernet on Cisco Catalyst 4500-E, page 6](#)

Table 1 Supported Hardware on Cisco Catalyst 4500E

| Product Number (append with “=” for spares) | Product Description |
|--|--|
| Supervisor Engines | |
| WS-X45-Sup7-E | Catalyst 4500-E series switch Supervisor Engine 7-E Note This engine is supported on E-series, R-E, and R+E chassis. |
| WS-X45-Sup7L-E | Catalyst 4500-E series switch Supervisor Engine 7L-E Note This engine is supported on E-series, R-E, and R+E chassis. |
| WS-X45-Sup8-E | Catalyst 4500-E series switch Supervisor Engine 8-E This engine is supported on E-series and R+E and R-E ¹ chassis. |
| 10 Gigabit Ethernet Switching Modules | |
| WS-X4748-12X48U+E | Catalyst 4500E 48-Port UPOE with 12 Multigigabit ports and 36 10/100/1000 ports. This module supports the Cisco Multigigabit technology for 802.11ac Wave2 and 10GBASE-T speeds. |

Table 1 Supported Hardware on Cisco Catalyst 4500E

| Product Number (append with “=” for spares) | Product Description |
|--|--|
| 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 |
| 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-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 This linecard is not supported on Supervisor Engine 8-E. |
| 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-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-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) |
| 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 |
| WS-X4748-UPOE+E | 48-port 10/100/1000 line card nonblocking PoE 802.3at and 60 watt UPOE PoE linecard with Ethernet Energy Efficient feature. |
| WS-X4748-RJ45-E | 48-port 10/100/1000 nonblocking line card with the Ethernet Energy Efficient feature |
| WS-X4748-SFP-E | 48-port 1000Base-X SFP (small form factor pluggable) line card |
| WS-X4724-SFP-E | 24-port 1000Base-X SFP (small form factor pluggable) line card |
| WS-X4712-SFP-E | 12-port 1000Base-X SFP (small form factor pluggable) line card |
| 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 |

Table 1 Supported Hardware on Cisco Catalyst 4500E

| Product Number (append with “=” for spares) | Product Description |
|--|---|
| 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 |
| 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-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 |
| Other Modules | |
| MEM-X45-2GB-E | SD Card, 2G |
| USB-X45-4GB-E | USB Thumb Drive, 4G |

- The Cisco Catalyst 4507R-E Switch chassis that has hardware revision 2.0 or higher supports Supervisor Engine 8-E. For information about identifying the revision numbers see the “[Identifying Hardware Revisions on the Switch Chassis](#)” section on page 45.

Table 2 Supported Pluggable Transceiver Modules

| Module Type | URL |
|--|---|
| Cisco 10-Gigabit Ethernet Transceiver Modules Compatibility Matrix | http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/10GE_Tx_Matrix.html |
| Cisco Gigabit Ethernet Transceiver Modules Compatibility Matrix | http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/GE_Tx_Matrix.html |
| Cisco 100-Megabit Ethernet SFP Modules Compatibility Matrix | http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/100MB_Tx_Matrix.html |
| Cisco Wavelength Division Multiplexing Transceivers Compatibility Matrix | http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_6982.html |
| Cisco 40-Gigabit Ethernet Transceiver Modules Compatibility Matrix | http://www.cisco.com/c/en/us/td/docs/interfaces_modules/transceiver_modules/compatibility/matrix/40GE_Tx_Matrix.html |

Table 3 Power over Ethernet on Cisco Catalyst 4500-E

| Type | URL |
|--|---|
| Power over Ethernet on the Cisco Catalyst 4500E Series Platform Data Sheet | http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-4500-series-switches/product_data_sheet09186a00801f3dd9.html |

Supported E-Series Hardware on Cisco IOS XE Release 3.7.xE

A brief list of primary E-Series hardware supported by Cisco IOS XE Release 3.7.xE is shown in [Table 4](#).

Table 4 Supported E-Series Hardware

| Product Number | Description |
|----------------|--|
| WS-C4503-E | Cisco Catalyst 4500-E Series 3-Slot Chassis <ul style="list-style-type: none"> Fan tray No Power Supply |
| WS-C4506-E | Cisco Catalyst 4500-E Series 6-Slot Chassis <ul style="list-style-type: none"> Fan tray No Power Supply |
| WS-C4507R-E | Cisco Catalyst 4500-E Series 7-Slot Chassis <ul style="list-style-type: none"> 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. <p>Note The WS-C4507R-E module requires hardware revision 2.0 or higher to support Supervisor Engine 8-E.</p> |
| WS-C4507R+E | Cisco Catalyst 4500-E Series 7-Slot 48 GB-ready Chassis <ul style="list-style-type: none"> 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. |

Table 4 Supported E-Series Hardware

| Product Number | Description |
|----------------|---|
| WS-C4510R-E | Cisco Catalyst 4500-E Series 10-Slot Chassis Note This chassis does not support the Supervisor Engine 7L-E. <ul style="list-style-type: none"> • 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 4500-E Series 10-Slot 48 GB-ready Chassis Note This chassis does not support the Supervisor Engine 7L-E. <ul style="list-style-type: none"> • 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. |

Wired Web UI (Device Manager) System Requirements

Software Requirements

- Windows 2000, Windows 2003, Windows XP, Windows Vista, or Windows 7
- With JavaScript enabled: Internet Explorer 6.0 and 7.0, or Firefox 26.0

Feature Support by Image Type

Table 5 is a detailed list of features supported on Catalyst 4500-E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E running Cisco IOS XE Software Release 3.7.xE categorized by image type. Please visit Feature Navigator for package details:

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



Note

Wireless features supported on Supervisor Engine 8-E are available only on IP Base and Enterprise Services images.

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|-------------------------------|----------|---------|---------------------|
| 2-way Community Private VLANs | No | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-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 Policy Enhancements | Yes | Yes | Yes |
| ACL Sequence Numbering | Yes | Yes | Yes |
| Address Resolution Protocol (ARP) | 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 |
| ARP Optimization | Yes | Yes | Yes |
| Auto Configuration | Yes | Yes | Yes |
| Auto-LAG | Yes | Yes | Yes |
| Auto QoS | Yes | Yes | Yes |
| Auto QoS Compact | Yes | Yes | Yes |
| Auto Security | Yes | Yes | Yes |
| Auto SmartPorts | 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 |
| Banner Page and Inactivity timeout for HTTP/S connections | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| 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 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 |
| BGP Wildcard | No | No | Yes |
| Bidirectional PIM (IPv4 only) | No | Yes | Yes |
| Bidirectional SXP support | Yes | Yes | Yes |
| Boot Config | Yes | Yes | Yes |
| Broadcast/Multicast Suppression | Yes | Yes | Yes |
| Call Home | No | Yes | Yes |
| CDP (Cisco Discovery Protocol) Version 2 | Yes | Yes | Yes |
| CDP Enhancement - Host presence TLV | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| CEF/dCEF - Cisco Express Forwarding | Yes | Yes | Yes |
| CEFv6 Switching for 6to4 Tunnels | No | Yes | Yes |
| CEFv6/dCEFv6 - Cisco Express Forwarding | Yes | Yes | Yes |
| CFM/IEEE 802.1ag - D8.1 standard Compliant CFM, Y.1731 multicast LBM / AIS / RDI / LCK, IP SLA for Ethernet | Yes | Yes | Yes |
| CGMP - Cisco Group Management Protocol | No | Yes | Yes |
| Cisco IOS Scripting w/Tcl | Yes | Yes | Yes |
| Cisco Plug-in for OpenFlow | Yes | Yes | Yes |
| Cisco Service Discovery Gateway Support | Yes | 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 |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| Community Private VLAN | No | Yes | Yes |
| Configuration 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 |
| Configuring FQDN ACL | Yes | Yes | Yes |
| Contextual Configuration Diff Utility | Yes | Yes | Yes |
| Control Plane Policing (Copp) | Yes | Yes | Yes |
| Control Plane Protection (Wireless) | No | Yes | Yes |
| CPU Optimization for Layer 3 Multicast Control Packets | Yes | Yes | Yes |
| Critical Authorization for Voice and Data | 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 Client | Yes | Yes | Yes |
| DHCP Configurable DHCP Client | Yes | Yes | Yes |
| DHCP Gleaning | No | Yes | Yes |
| DHCPv6 Relay Agent notification for Prefix Delegation | Yes | Yes | Yes |
| DHCP Option 82, Pass Through | Yes | Yes | Yes |
| DHCP Server | Yes | Yes | Yes |
| DHCP Snooping | Yes | Yes | Yes |
| DHCPv6 Ethernet Remote ID option | Yes | Yes | Yes |
| DHCPv6 Relay - Reload persistent Interface ID option | Yes | Yes | Yes |
| DHCPv6 Repackaging | Yes | Yes | Yes |
| Diffserv MIB | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|-----------------------------------|---------------------------------------|
| DSCP/CoS via LLDP | Yes | Yes | Yes |
| Duplication Location Reporting Issue | No | Yes | Yes |
| Dynamic Trunking Protocol (DTP) | Yes | Yes | Yes |
| Easy Virtual Network (EVN) | No | No | Yes |
| Easy VSS ¹ | No | Yes (SUP7E and SUP8E only) | Yes (SUP7E, SUP7LE, and SUP8E) |
| 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 Syslog Manager (ESM) | Yes | Yes | Yes |
| Enable Bidirectional SXP support | Yes | Yes | Yes |
| Enable of Security Group ACL at Interface Level | Yes | Yes | Yes |
| Energywise Agentless SNMP support | Yes | Yes | Yes |
| Energywise Wake-On-Lan Support | Yes | Yes | 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 Single Port Channel | Yes | Yes | Yes |
| Ethernet Virtual Connections (EVC)-Lite | No | Yes | Yes |
| Fast EtherChannel (FEC) | Yes | Yes | Yes |
| FHRP - Enhanced Object Tracking of IP SLAs | Yes | Yes | Yes |
| FHRP - Enhanced Object Tracking integration with EEM | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| 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 |
| FIPS 140-2/3 Level 2 Certification | Yes | Yes | Yes |
| FIPS/CC Compliance for NMSP | Yes | Yes | Yes |
| Flexible NetFlow - Application ID | No | Yes | Yes |
| Flexible NetFlow - CTS Fields | No | Yes | Yes |
| Flexible NetFlow - Device type | No | Yes | Yes |
| Flexible NetFlow - Ethertype | No | Yes | Yes |
| Flexible NetFlow - Full Flow support | 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 - Multiple User Defined Caches | No | Yes | Yes |
| Flexible NetFlow - NetFlow Export over IPv4 | No | Yes | Yes |
| Flexible NetFlow - NetFlowV5 Export protocol | No | Yes | Yes |
| Flexible NetFlow - NetFlow v9 Export Format | No | Yes | Yes |
| Flexible NetFlow - Power Reading | No | Yes | Yes |
| Flexible NetFlow - Username | No | Yes | Yes |
| Flexible NetFlow - VLAN ID support | No | Yes | Yes |
| Flexible NetFlow - Export to an IPv6 address | No | Yes | Yes |
| Flexible NetFlow - IPFIX | No | Yes | Yes |
| Flex Links+(VLAN Load balancing) | Yes | Yes | Yes |
| Forced 10/100 Autonegotiation | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| FQDN | 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 |
| GOLD Online Diagnostics | Yes | Yes | Yes |
| GRE Tunneled Packets Switched on Hardware | No | No | Yes |
| HSRP: Global IPv6 Address | No | Yes | Yes |
| HSRP - Hot Standby Router Protocol | No | Yes | Yes |
| HSRPv2 for IPv6 Global Address Support | No | Yes | Yes |
| HTTP Gleaning | No | Yes | Yes |
| HTTP Security | Yes | Yes | Yes |
| HTTP TACAC+ Accounting support | 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 | Yes | Yes |
| 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 ² | 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 |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| IEEE 802.1x Open Authentication | Yes | Yes | Yes |
| IEEE 802.1X with User Distribution | 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 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 802.3ad Link Aggregation (LACP) Port-Channel Standalone Disable | Yes | Yes | Yes |
| IEEE 802.3af PoE (Power over Ethernet) | Yes | Yes | Yes |
| IEEE 802.3x Flow Control | Yes | Yes | Yes |
| 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 |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| IGMP Version 3 - Explicit Tracking of Hosts, Groups, and Channels | Yes | Yes | Yes |
| IGMPv3 Host Stack | 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 |
| Interface Templates | Yes | Yes | Yes |
| IOS Based Device Profiling | No | Yes | Yes |
| IP Enhanced IGRP Route Authentication | No | No | Yes |
| 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 |
| IPv6 Tunnels (in software) | No | Yes | Yes |
| IP Routing | Yes | Yes | Yes |
| IP SLAs - DHCP Operations | 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 SLA - HTTP Operation | No | Yes | Yes |
| IP SLAs - ICMP Echo Operation | No | Yes | Yes |
| IP SLAs - ICMP Path Echo Operation | No | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| 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 - 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 - Video Operations | No | Yes | Yes |
| IP SLAs - VoIP Threshold Traps | No | Yes | Yes |
| IP Summary Address for RIPv2 | No | Yes | Yes |
| IP Unnumbered for VLAN-SVI interfaces | No | Yes | Yes |
| IPSG (IP Source Guard) v4 | Yes | Yes | Yes |
| IPSG (IP Source Guard) v4 for Static Hosts | Yes | Yes | Yes |
| IPv4 Policy-Based Routing | No | Yes | Yes |
| IPv4 Policy-Based Routing with recursive next hop | No | Yes | Yes |
| IPv4 Routing: Static Hosts/Default Gateway | Yes | Yes | Yes |
| IPv6 ACL Wild Card Masking | Yes | Yes | Yes |
| IPv6 / v4 BFD with OSPF/ BGP/ EIGRP and Static | No | Yes | Yes |
| IPv6 BGP | No | No | Yes |
| IPv6 Bootstrap Router (BSR) Scoped Zone Support | No | No | Yes |
| IPv6 CNS Agents | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| IPv6 Config Logger | Yes | Yes | Yes |
| IPv6 First Hop Security (FHS): DHCPv6 Guard IPv6 Destination Guard IPv6 Snooping (Data Gleaning, per-limit Address Limit) IPv6 Neighbor Discovery (ND) Inspection IPv6 Neighbor Discovery Multicast Suppression IPv6 Router Advertisement (RA) Guard | Yes | Yes | Yes |
| IPv6 First Hop Security (FHS) Phase 2: Binding table recovery Lightweight DHCPv6 Relay Agent (LDRA) Neighbor Discovery (ND) Multicast Suppress Source and Prefix Guard ³ FHS EtherChannel Support | Yes | Yes | Yes |
| IPv6 HSRP | No | Yes | Yes |
| IPv6 HTTP(S) | Yes | Yes | Yes |
| IPv6 ICMPv6 | Yes | Yes | Yes |
| IPv6 ICMPv6 Redirect | Yes | Yes | Yes |
| IPv6 Interface Statistics | Yes | Yes | Yes |
| IPv6 IP SLAs (UDP Jitter, UDP Echo, ICMP Echo, TCP Connect) | No | Yes | Yes |
| IPv6 Static Route support for Object Tracking | Yes | Yes | Yes |
| IPv6 TCL | Yes | Yes | Yes |
| IPv6 (Internet Protocol Version 6) | Yes | Yes | Yes |
| IPv6 Interface Statistics | Yes | Yes | Yes |
| IPv6 Access Services: DHCPv6 Relay Agent | No | Yes | Yes |
| IPv6: Anycast Address | Yes | Yes | Yes |
| IPv6 MLD Snooping v1 and v2 | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|------------------|---------------------|
| 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 Duplicate Address Detection | Yes | Yes | Yes |
| IPv6 OSPFv3 NSF/SSO | No | Yes ⁴ | Yes |
| IPv6 OSPFv3 Fast Convergence | No | Yes ⁴ | Yes |
| IPv6 PACL | Yes | Yes | Yes |
| IPv6 Policy-Based Routing | No | No | Yes |
| IPv6 RA Guard (Host Mode) | Yes | Yes | Yes |
| IPv6 Routing - EIGRP Support | No | No | Yes |
| IPv6 Routing: OSPF for IPv6 (OSPFv3) | No | Yes ⁴ | Yes |
| IPv6 Routing: RIP for IPv6 (RIPng) | No | Yes | Yes |
| IPv6 Routing: Route Redistribution | No | Yes | Yes |
| IPv6 Routing: Static Routing | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| IPv6 Security: Secure Shell SSH support over IPv6 | Yes | Yes | Yes |
| IPv6 Services: AAAA DNS Lookups over an IPv4 Transport | No | Yes | Yes |
| 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 Static Routing: Support for Tracking Objects | Yes | Yes | Yes |
| IPv6 Support for SGT/SGACL | Yes | Yes | Yes |
| IPv6 Switching: CEF Support | No | Yes | Yes |
| IPv6 Switching: CEFv6 Switched Automatic IPv4-compatible 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 |
| IPv6 Virtual LAN Access Control List (VACL) | Yes | Yes | Yes |
| IPsecv3/IKEv2 (for management traffic only) | Yes | Yes | Yes |
| IS-IS for IPv4 and IPv6 | No | No | Yes |
| ISSU (IOS In-Service Software Upgrade) | No | Yes | Yes |
| Jumbo Frames | Yes | Yes | Yes |
| Link Aggregation Control Protocol | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| LACP Rate Fast | Yes | Yes | Yes |
| Layer 2 Control Packet | Yes | Yes | Yes |
| Layer 2 Protocol Tunneling (L2PT) | No | Yes | Yes |
| L2TP for LACP and PAgP | No | Yes | Yes |
| L2TP for UDLD | No | Yes | Yes |
| Layer 2 Traceroute | No | Yes | Yes |
| Layer 3 Multicast Routing (PIM SM, SSM, Bidir) | No | Yes | Yes |
| Link State Tracking | Yes | Yes | Yes |
| Loadsharing IP packets over more than six parallel paths | Yes | Yes | Yes |
| Local Proxy ARP | Yes | Yes | Yes |
| Location MIBs | Yes | Yes | Yes |
| MAB with Configurable User Name/Password | Yes | Yes | Yes |
| MAB for Voice VLAN | Yes | Yes | Yes |
| MAC Address Notification | Yes | Yes | Yes |
| MAC Authentication Bypass | Yes | Yes | Yes |
| MAC Move and Replace | Yes | Yes | Yes |
| Medianet: AutoQoS SRND4 Macro | No | Yes | Yes |
| Medianet: Integrated Video Traffic Simulator (hardware-assisted IP SLA); IPSLA generator and responder | No | Yes | Yes |
| Medianet: Flow Metadata | No | Yes | Yes |
| Medianet: Media Service Proxy | No | Yes | Yes |
| Medianet: Media Monitoring (Performance Monitoring and Mediatrace) | No | Yes | Yes |
| Memory Threshold Notifications | Yes | Yes | Yes |
| Microflow policers | No | Yes | Yes |
| Modular QoS CLI (MQC) | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| Multi-authentication and VLAN Assignment | Yes | Yes | Yes |
| Multi-VRF Support (VRF lite) | No | No | Yes |
| Multicast BGP (MBGP) | No | No | Yes |
| Multicast Fast Switching Performance Improvement | No | Yes | Yes |
| Multicast HA (NSF/SSO) for IPv4&IPv6 | No | Yes | Yes |
| Multicast Routing Monitor (MRM) | No | No | Yes |
| Multicast Source Discovery Protocol (MSDP) | No | Yes | Yes |
| Multicast Subsecond Convergence | No | Yes | Yes |
| Multicast VLAN Registration (MVR) | Yes | Yes | 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 |
| NETCONF over SSHv2 | Yes | Yes | Yes |
| Network Edge Access Topology (NEAT) | Yes | Yes | Yes |
| Network Time Protocol (NTP) | Yes | Yes | Yes |
| Network Time Protocol (NTP) primary (formerly known as Network Time Protocol (NTP) master) | Yes | Yes | Yes |
| Next Hop Resolution Protocol (NHRP) | No | No | Yes |
| NMSP Enhancements <ul style="list-style-type: none"> • GPS support for location • Location at switch level • Local timezone change • Name value pair • Priority settings for MIBs | No | Yes | Yes |
| No Service Password Recovery | Yes | Yes | Yes |
| No. of VLAN Support | 2048 | 4096 | 4096 |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|------------------|---------------------|
| 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 | Yes | Yes |
| NTP for IPv6 | Yes | Yes | Yes |
| NTP for VRF aware | No | No | Yes |
| Object Group ACLs (OGACLs) | Yes | Yes | Yes |
| Object Tracking: IPv6 Route Tracking | No | Yes | Yes |
| Onboard Failure Logging (OBFL) | Yes | Yes | Yes |
| Open Plug-N-Play Agent | Yes | Yes | Yes |
| OSPF | No | Yes ⁴ | Yes |
| OSPF v3 Authentication | No | Yes ⁴ | Yes |
| OSPF Flooding Reduction | No | Yes ⁴ | Yes |
| OSPF for Routed Access ⁵ | No | Yes | Yes |
| OSPF Incremental Shortest Path First (i-SPF) Support | No | Yes ⁴ | Yes |
| OSPF Link State Database Overload Protection | No | Yes ⁴ | Yes |
| OSPF Not-So-Stubby Areas (NSSA) | No | Yes ⁴ | Yes |
| OSPF Packet Pacing | No | Yes ⁴ | Yes |
| OSPF Shortest Paths First Throttling | No | Yes ⁴ | Yes |
| OSPF Stub Router Advertisement | No | Yes ⁴ | Yes |
| OSPF Support for Fast Hellos | No | Yes ⁴ | Yes |
| OSPF Support for Link State Advertisement (LSA) Throttling | No | Yes ⁴ | Yes |
| OSPF Support for Multi-VRF on CE Routers | No | Yes ⁴ | Yes |
| OSPF Update Packet-Pacing Configurable Timers | No | Yes ⁴ | Yes |
| PBR Support for Multiple Tracking Options | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|--------------------------|--------------------------|--------------------------|
| PBR VRF-aware | No | No | Yes |
| Per Intf IGMP State Limit | Yes | Yes | Yes |
| Per Intf MrouteState Limit | Yes | Yes | Yes |
| Per Port Per VLAN Policing | Yes | Yes | Yes |
| Per-User ACL Support for 802.1X/MAB/Webauth users | Yes | Yes | Yes |
| Per-VLAN Learning | Yes | Yes | Yes |
| Permanent Right-to-Use (PRTU) license | 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 |
| PnP Agent | Yes | Yes | Yes |
| PoEP via LLDP | Yes | Yes | Yes |
| Port Security | Yes (supports 1024 MACs) | Yes (supports 3072 MACs) | Yes (supports 3072 MACs) |
| Port Security on Etherchannel Trunk Port | Yes | Yes | Yes |
| Port Security MAC Address Filtering | 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 |
| 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 |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| 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 |
| RADIUS Change of Authorization | Yes | Yes | Yes |
| Rapid PVST+ Dispute Mechanism | Yes | Yes | Yes |
| Rapid-Per-VLAN-Spanning Tree (Rapid-PVST) | Yes | Yes | Yes |
| Reduced MAC Address Usage | Yes | Yes | Yes |
| Redundancy Facility Protocol | Yes | Yes | Yes |
| Remote SPAN (RSPAN) | Yes | Yes | Yes |
| REP (Resilient Ethernet Protocol) | Yes | Yes | Yes |
| REP - No Edge Neighbor Enhancement | Yes | Yes | Yes |
| RIP v1 | No | Yes | Yes |
| RMON events and alarms | Yes | Yes | Yes |
| Secure CDP | Yes | Yes | Yes |
| Secure Copy (SCP) | Yes | Yes | Yes |
| Secure Shell SSH Version 2 Client Support | Yes | Yes | Yes |
| Secure Shell SSH Version 2 Server Support | Yes | Yes | Yes |
| Security Group ACL at Interface Level | Yes | Yes | Yes |
| Single Rate 3-Color Marker for Traffic Policing | Yes | Yes | Yes |
| Smart Install Director—Configuration-only Deployment and Smooth Upgrade | Yes | Yes | Yes |
| Smart Port | Yes | Yes | Yes |
| SMI Catalyst 4K Client | Yes | Yes | Yes |
| SNMP (Simple Network Management Protocol) | Yes | Yes | Yes |
| SNMP Inform Request | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|------------------|---------------------------------|---------------------------------|
| 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 (# of sessions) – Port Mirroring | Yes (4 sessions) | Yes (16 bidirectional sessions) | Yes (16 bidirectional sessions) |
| SPAN ACL Filtering for IPv6 | Yes | 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 |
| 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 |
| Stateful Switchover | No | Yes | Yes |
| Standard IP Access List Logging | Yes | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|---------|---------------------|
| 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 |
| Sub-second UDLD | Yes | 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 |
| TACACS+ and Radius for IPv6- | Yes | Yes | Yes |
| TCAM4 - Dynamic Multi-Protocol | Yes | Yes | Yes |
| TCAM4 - Service-Aware Resource Allocation | Yes | Yes | Yes |
| Time Domain Reflectometry (TDR) ⁶ | Yes | 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 |
| TrustSec: IEEE 802.1ae MACSec Layer 2 encryption | No | Yes | Yes |
| TrustSec: IEEE 802.1ae MACSec encryption on user facing ports | No | Yes | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|---|----------|-------------------------------|-----------------------------------|
| 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 |
| TrustSec Critical Authentication | Yes | Yes | Yes |
| TrustSec SGT Exchange Protocol (SXP) IPv4 | No | Yes | Yes |
| TrustSec SGT/ SGA | No | 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) for IPv4 | No | Yes | Yes |
| Virtual Switching System (VSS) | No | Yes (SUP7E and SUP8E only) | Yes (SUP7E, SUP7LE, and SUP8E) |
| Virtual Switching System (VSS): Layer 2 Protocol Tunneling, VLAN Translation, and Q-in-Q | 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 |
| VLAN Mapping (VLAN Translation) | No | Yes | Yes |
| VRF-aware Copy Commands | No | Yes | Yes |
| VRF-aware TACACS+ | No | No | Yes |
| VRF-lite for IPv6 on OSPF/ BGP/ EIGRP | No | No | Yes |

Table 5 LAN Base, IP Base, and Enterprise Services Image Support on Cisco Catalyst 4500E Supervisor Engine 7-E, Supervisor Engine 7L-E, and Supervisor Engine 8-E

| Feature | LAN Base | IP Base | Enterprise Services |
|--|----------|---------|---------------------|
| VRRPv3: Object Tracking Integration | No | Yes | Yes |
| VRRPv3 Protocol Support | No | Yes | Yes |
| VTP (Virtual Trunking Protocol) Version 2 | Yes | Yes | Yes |
| VTP Version 3 | Yes | Yes | Yes |
| WCCP Version 2 | No | Yes | Yes |
| WCCP Version 2 on VSS | No | No | Yes |
| Web Authentication Proxy | Yes | Yes | Yes |
| Web Authentication Redirection to Original URL | Yes | Yes | Yes |
| Webauth Enhancements | Yes | Yes | Yes |
| Wired Guest Access ⁷ | No | Yes | Yes |
| Wireshark-based Ethernet Analyzer | No | Yes | Yes |
| XML-PI | Yes | Yes | Yes |

1. Catalyst 4500-X, Supervisor Engine 7-E, and Supervisor Engine 8-E; IP Base. Supervisor Engine 7L-Ent Services
2. IEEE 802.1t—An IEEE amendment to IEEE 802.1D that includes extended system ID, long path cost, and PortFast.
3. When either Source or Prefix Guard for IPv6 is enabled, ICMPv6 packets are unrestricted on all Catalyst 4500 series switch platforms running IOS Cisco Release 15.2(1)E. All other traffic types are restricted.
4. IP Base supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 200 dynamically learned routes.
5. OSPF for Routed Access supports only one OSPFv2 and one OSPFv3 instance with a maximum number of 1000 dynamically learned routes.
6. TDR is not supported on 46xx linecards.
7. Wired Guest Access is supported only in wireless mode on Supervisor Engine 8-E, when the switch functions as a mobility agent and or a mobility controller.

OpenFlow Version and Cisco IOS Release Support

The following table provides OpenFlow compatibility information for the Cisco Catalyst 4500-E Series Switches. The OVA package is available for download in the same location as your system image (.bin) file, on cisco.com



Note

The OVA package is compatible only with its corresponding system image file name - as listed in the table below. Do not use an older version of the OVA package with a newer system image file, or a newer OVA package with an older system image file.

Table 6 *Image Support for OpenFlow Version and Cisco IOS Release Support for Cisco OpenFlow Plug-In*

| Platform | Cisco IOS Release | Cisco OpenFlow Plug-In Version | Cisco OpenFlow Plug-In | Image Name |
|--|-------------------|--------------------------------|------------------------------------|--|
| Catalyst 4500-E Series Switches with Supervisor Engine 8-E | IOS XE 3.7.2E | 2.0.2 | ofa-2.0.2-r2-cat4500es8-SPA-k9.ova | cat4500es8-universalk9.SSA.03.07.02.E2.295.152-3.2.95.E2.bin |
| Catalyst 4500-E Series Switches with Supervisor Engine 7-E/ 7L-E | IOS XE 3.7.2E | 2.0.2 | ofa-2.0.2-r2-cat4500-SPA-k9.ova | cat4500e-universalk9.SSA.03.07.02.E2.295.152-3.2.95.E2.bin |
| Catalyst 4500-E Series Switches with Supervisor Engine 8-E | IOS XE 3.7.1E | 2.0.0 | ofa-2.0.0-r1-cat4500es8-SPA-k9.ova | cat4500es8-universalk9.SPA.03.07.01.E.152-3.E1.bin |
| Catalyst 4500-E Series Switches with Supervisor Engine 7-E/ 7L-E | IOS XE 3.7.1E | 2.0.0 | ofa-2.0.0-r1-cat4500-SPA-k9.ova | cat4500e-universalk9.SPA.03.07.01.E.152-3.E1.bin |

MIB Support

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

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

Features Not Supported on the Cisco Catalyst 4500-E Series Switch

The following features are not supported on a Catalyst 4500-E series switch with Supervisor Engine 7-E and Supervisor Engine 7L-E:

- CISCO-IETF-IP-FORWARD-MIB
- CISCO-IETF-IP-MIB
- LLDP HA
- WCCP Version 1
- SSH Version 1
- **isis network point-to-point** command

Orderable Product Numbers

Table 7 Cisco IOS XE Software Release 3.7.0E Product Numbers and Images for the Catalyst 4500E Series Switch

| Product Number | Description | Image |
|-------------------------------------|--|-------------------------------|
| S45EU-37-1523E S45EU-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal Image | cat4500e-universal.bin |
| S45EUN-37-1523E S45EUN-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal No MACSEC Image | cat4500e-universalk9npe.bin |
| S45EUK9-37-1523E S45EUK9-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal Crypto Image | cat4500e-universalk9.bin |
| S8EULPE-37-1523E S45EULPE-S8-37E | CAT4500e SUP8e Universal LPE Image | cat4500es8-universalk9npe.bin |
| S8EUK9-37-1523E S45EUK9-S8-37E | CAT4500e SUP8e Universal Crypto Image | cat4500es8-universalk9.bin |
| S8EU-37-1523E S45EU-S8-37E | CAT4500e SUP8e Universal Image | cat4500es8-universal.bin |

| Product Number | Description | Image |
|-------------------------------------|--|-------------------------------|
| S45EU-37-1523E S45EU-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal Image | cat4500e-universal.bin |
| S45EUN-37-1523E S45EUN-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal No MACSEC Image | cat4500e-universalk9npe.bin |
| S45EUK9-37-1523E S45EUK9-S7-37E | CAT4500e SUP7-E/SUP7L-E Universal Crypto Image | cat4500e-universalk9.bin |
| S8EULPE-37-1523E S45EULPE-S8-37E | CAT4500e SUP8e Universal LPE Image | cat4500es8-universalk9npe.bin |
| S8EUK9-37-1523E S45EUK9-S8-37E | CAT4500e SUP8e Universal Crypto Image | cat4500es8-universalk9.bin |
| S8EU-37-1523E S45EU-S8-37E | CAT4500e SUP8e Universal Image | cat4500es8-universal.bin |

New and Changed Information

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

- [New Features in IOS XE 3.7.3E, page 32](#)
- [New Features in IOS XE 3.7.2E, page 32](#)

- [New Features in IOS XE 3.7.1E, page 33](#)
- [New Features in IOS XE 3.7.0E, page 35](#)

New Features in IOS XE 3.7.3E

| Feature Name | Description |
|--|---|
| Default PVRST+ | Rapid PVST+ is now the default spanning-tree mode used on all Ethernet port-based VLANs. (LAN Base, IP Base, and IP Services/Enterprise Services) |
| Enhancement to Web-auth configuration | Commands under global parameter-map to enable non SVI and VRF aware Web-auth configuration. (LAN base, IP base and IP Services/Enterprise Services) |
| Named VLAN | Option to specify a VLAN name for access and voice VLAN. (LAN Base, IP Base, and IP Services/Enterprise Services) |
| Mobility Controller managing Mobility Agent (MCMA) | The Mobility Controller managing Mobility Agent feature allows you to push the wireless and common configurations from the MC to the MAs. (IP Base, IP Services/Enterprise Services) |



Note

In IOS XE Release 3.7.2 and earlier, the clients were not able to get DHCP on the guest anchored WLAN, which is configured on the 4500 MA Foreign Controller. This issue was resolved on IOS XE Release 3.7.3.

New Features in IOS XE 3.7.2E

The Cisco IOS XE Release 3.7.xE Documentation Roadmap provides quick and easy access to all relevant documentation for specific platforms. Look for Quick Links to Platform Documentation on the respective platform documentation pages. For more information, see <http://www.cisco.com/c/en/us/support/ios-nx-os-software/ios-xe-3e/tsd-products-support-series-home.html>.

New Hardware Features in Release IOS XE 3.7.2E

| Feature Name | Description |
|------------------------------|--|
| DOM Support for Transceivers | Introducing DOM support for optics GLC-SX-MMD, GLC-LH-SMD, and GLC-ZX-SMD on the Catalyst 4500-E switches with Supervisor Engine 7-E, Supervisor Engine 7L-E, Supervisor Engine 8-E, Supervisor Engine 8L-E, and WS-X4712-SFP+E, WS-X4748-SFP-E, WS-X4624-SFP-E, WS-X4602-10GE, WS-X4724-SFP-E, WS-X4712-SFP-E, WS-X4612-SFP-E, WS-X4640-CSFP-E and WS-X4606-X2-E modules. |

New Software Features (Wired) in Release IOS XE 3.7.2E

| Feature Name | Description |
|----------------------|---|
| Object Group Command | Enhancements to the object-group global configuration command. Detailed information is available in the <i>Catalyst 4500 Series Switch Cisco IOS Command Reference, IOS XE 3.7.0E and IOS 15.2.(3)E</i> . (LAN Base, IP Base, and Enterprise Services) |
| Auto-LAG | Support for auto-LAG, which provides the ability to auto create EtherChannels on ports connected to a switch. By default, auto-LAG is disabled globally and is enabled on all port interfaces. The auto-LAG applies to a switch only when it is enabled globally. (LAN Base, IP Base, and Enterprise Services) |

New Features in IOS XE 3.7.1E

This section lists the new features in Release IOS XE 3.7.1E.

New Hardware Features in Release IOS XE 3.7.1E

| Feature Name | Description |
|---------------------------------------|--|
| Multigigabit Module WS-X4748-12X48U+E | Support for the new multigigabit module WS-X4748-12X48U+E on the Cisco Catalyst 4503-E, Cisco Catalyst 4506-E, Cisco Catalyst 4507R+E, and Cisco Catalyst 4510R+E chassis. Support to upgrade to a new line card FPGA image has been introduced, for the WS-X4748-12X48U+E module. For more information, see <ul style="list-style-type: none"> http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/XE3-7-0E/15-23E/configuration/guide/xe-370-configuration/sw_int.html http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/hardware/configuration/notes/OL_25315.html |

New Software Features (Wired) in Release IOS XE 3.7.1E

| Feature Name | Description |
|---|---|
| Cisco Plug-In for OpenFlow | <p>Support for Cisco Plug-in for OpenFlow (Cisco Plug-in for OpenFlow, Version 2.0.0) provides better control over networks making them more open, programmable, and application-aware.</p> <p>The Cisco plug-in supports a subset of OpenFlow 1.3 and OpenFlow 1.0 functions. For the list of supported functions and configuration information, see the Cisco Plug-in for OpenFlow Configuration Guide for Catalyst 4500 Series Switches.</p> <p>For compatibility information, see OpenFlow Version and Cisco IOS Release Support, page 29</p> <p>(LAN Base, IP Base, and Enterprise Services)</p> |
| FNF—CTS Fields | <p>CTS Fields Support for Cisco TrustSec (CTS) fields, to monitor and troubleshoot the CTS network, and to segregate traffic based on source group tag (SGT) values.</p> <p>(IP Base and Enterprise Services)</p> |
| GRE Tunneler Packets Switched on Hardware | <p>Support for forwarding GRE tunneled packets on the Catalyst 4500 series switches hardware.</p> <p>(Enterprise Services)</p> |
| L2PT for LACP and PAgP | <p>Support for point-to-point protocol tunneling of LACP and PAgP protocols.</p> <p>(IP Base and Enterprise Services)</p> |
| L2PT for UDLD | <p>Support for Layer 2 tunneling of the UDLD protocol. This can be used in conjunction with the LACP or PAgP point-to-point tunneling or by itself, for unidirectional tunnel detection.</p> <p>(IP Base and Enterprise Services)</p> |
| LACP Rate Fast | <p>Support for the new lACP rate command, to set the rate at which Link Aggregation Control Packets (LACP) packets are sent to LACP-supported interfaces. You can change the timeout rate from 30 seconds (default rate) to 1 second (fast rate).</p> <p>(LAN Base, IP Base, and Enterprise Services)</p> |
| NHRP | <p>Support for Next Hop Resolution Protocol (NHRP).</p> <p>(Enterprise Services)</p> |
| Object Group ACLs (OGACLs) | <p>Support for Object Group ACLs (OGACLs), to group ACE entries, and add or remove entries, while keeping your ACL structure more readable.</p> <p>(LAN Base, IP Base, and Enterprise Services)</p> |
| Port Security MAC Address Filtering | <p>Support for MAC address filtering. You can prevent the switch from learning specific MAC addresses, by forbidding the MAC addresses on all interfaces, globally, or on a specific port-security enabled interface.</p> <p>(LAN Base, IP Base, and Enterprise Services)</p> |
| VRF-aware copy commands | <p>Support for VRF copy commands. You can specify a VRF for copy commands (FTP, TFTP, SCP etc.), when copying files to and from the switch.</p> <p>(IP Base and Enterprise Services)</p> |
| WCCP Version 2 on VSS | <p>Support for WCCP Version 2 on VSS, on the Enterprise Services image only.</p> <p>(Enterprise Services)</p> |


New Software Features (Wireless) in Release IOS XE 3.7.1E

| Feature Name | Description |
|--|--|
| Support for 100 APs | Increased scale on Catalyst 4500E series switch with Supervisor Engine 8-E to support up to 100 access points. Previously, support was up to 50 access points. |
| Mobility Controller managing Mobility Agent (MCMA) | Support for Mobility Agent on Catalyst 4500-E series switch with Supervisor Engine 8-E. |

New Features in IOS XE 3.7.0E

This section lists the new features in Release IOS XE 3.7.0E.

New Hardware Features in Release IOS XE 3.7.0E

| Feature Name | Description |
|---|---|
| WS-X45-Sup8-E on Catalyst 4510R-E chassis | Support for WS-X45-Sup8-E on the Cisco Catalyst 4507R-E and Cisco Catalyst 4510R-E switch chassis.  Note The Cisco Catalyst 4507R-E Switch chassis requires hardware revision 2.0 or higher to support Supervisor Engine 8-E. For information about identifying the hardware revision number see the “Identifying Hardware Revisions on the Switch Chassis” section on page 45. |
| USB ports on Supervisor Engine 8-E | Support for USB ports on Supervisor Engine 8-E, with hardware revision 1.1 or higher. |
| Line cards in slot 10 | Support for line cards other than 47xx line cards, in slot 10. |

New Software Features (Wireless) in Release IOS XE 3.7.0E

Wireless capability is added to Catalyst 4500E series switch with Supervisor Engine 8-E (Sup 8-E). The wireless feature parity is with the Cisco Catalyst 3850 and Catalyst 3650 Switch platforms.



Note

The MC managing MA feature introduced in this release on the Catalyst 3850 and Catalyst 3650 features is not supported on Sup 8-E.

The following table lists the new wireless features for Release IOS XE 3.7.0E:

| Feature Name | Description |
|----------------------|---|
| Access Point Support | In this release, support is added to the following access points: <ul style="list-style-type: none"> Cisco Aironet 1700 Series Access Point Cisco Aironet 1570 Series Access Point (supported only in Local mode) |
| VLAN Tagging | VLAN tagging is supported on Cisco Aironet 700W Series Access Points |

| Feature Name | Description |
|--|---|
| AVC Top 'n' Users by SSID | This feature enables you to know network usage information on a per user basis within an application. This feature is enabled by default and is available if AVC is enabled. |
| Regulatory Domain support | Regulatory domains for India (-D), Indonesia (-F), Brazil (-Z), Honk Kong (-S) are supported. |
| New Flexible NetFlow Collect Parameters | <ul style="list-style-type: none"> • collect wireless afd drop bytes—Collects the fields for wireless approximate fair drop (AFD) drop bytes • collect wireless afd accept bytes—Collects the fields for AFD accept bytes |
| View AFD statistics information | New CLI support to view AFD statistics information. Switch# show platform qos wireless stats ssid { <i>ssid-value</i> all } client all |
| Check Access Point Model Support | New CLI support to check whether an access point model is supported. Switch# show ap is-supported <i>ap-model-part-number</i> |
| Wireless AutoQoS | Support is added for Wireless AutoQoS |
| WebAuth sleeping client | <p>Allows successfully authenticated devices to stay logged in for a configured period without reauthentication.</p> <p>The following CLI is added under the webauth parameter map:</p> <p>sleeping-client timeout <i>timeout-in-minutes</i></p> <p>Restrictions:</p> <ul style="list-style-type: none"> – There is one-to-one mapping between device MAC and username/password. Once an entry is added to sleeping-client cache, the device/user gets policies for the user stored in the cache. Therefore, any other user using the device also gets the same policies as the user stored in the sleeping-client cache. The user can force normal authentication by logging out. To do that, the user must explicitly enter the following URL: <code>http[s]://<Virtual IP/Virtual Host>/logout.html</code> – Mobility is not supported. If the client roams from one controller to another, the client undergoes normal authentication on the foreign controller. |
| Control Plane Protection supported on Wireless | <p>Support is added for Control Plane Protection on Wireless (applicable only to Supervisor Engine 8-E)</p> <p>Note This feature is supported only Sup 8-E.</p> |

For more information about wireless functionality on the Supervisor Engine 8-E, see http://www.cisco.com/c/en/us/products/collateral/switches/catalyst-4500-series-switches/data_sheet_c78-728191.html.

For more wireless related information, see “Wireless Related Information” section on page 38

New Software Features (Wired) in Release IOS XE 3.7.0E

The following table list the new features for Release IOS XE 3.7.0E:

| Feature Name | Description |
|---|---|
| Auto-QoS Compact | Generates auto-QoS configuration that is hidden from running configuration. |
| CDP Bypass | <p>Authentication sessions are established in single and multi-host modes for IP Phones. However, if voice VLAN and 802.1x on an interface port is enabled, then CDP Bypass is enabled when the host mode is set to single or multi-host mode.</p> <p>Note By default the host mode is set to single mode in legacy mode and multi-authentication in the eedge mode.</p> <p>Use the following commands to configure CDP bypass:</p> <pre>Device> enable Device# configure terminal Device(config)# interface < interface-id > Device(config-if)# switchport mode access Device(config-if)# switchport voice vlan < vlan-id > Device(config-if)# authentication port-control auto Device(config-if)# authentication host-mode single multi-host Device(config-if)# dot1x pae authenticator</pre> |
| EtherChannel Max Number | Support for a maximum of 254 EtherChannels. |
| IPv6 FHS on EtherChannels | Support for all IPv6 First Hop Security Features over EtherChannel. You can apply these features either directly to EtherChannel interface, or over a VLAN that the EtherChannel belongs to. |
| IPv6 ACL Wild Card Masking | Support for IPv6 wild card masking when specifying the Layer 3 address of a IPv6 ACL entry |
| VRF-aware PBR | Support for Policy-Based Routing, on IPv4 and IPv6 traffic, on multiple virtual routing instances. |
| USB Support on Supervisor Engine8-E | Software support for USB ports on Supervisor Engine 8-E ¹ . |
| VLAN Name Extension | Increases the maximum characters supported in a VLAN name from 32 to 128. |
| VSS: Layer 2 Protocol Tunneling, VLAN Translation, and Q-in-Q | Support for Dot1q Tunnel (“legacy/classic” dot1q tunnel), Dot1q tunneling and L2PT (Layer 2 Protocol Tunneling), and VLAN Translation (1:1 and 1:2-Selective QinQ). |
| Wired Guest Access | Uses Ethernet in IP (RFC3378) within the centralized architecture to create a tunnel across a Layer 3 topology between two WLC endpoints. No additional protocols or segmentation techniques are needed to isolate guest traffic from the enterprise. |

1. This requires Supervisor Engine 8-E with hardware revision 1.1 or higher.

Cisco IOS XE to Cisco IOS

As [Table 8](#) shows, each version of Cisco IOS XE has an associated Cisco IOS version:

Table 8 Cisco IOS XE to Cisco IOS

| Cisco IOS XE Version | Cisco IOS Version | Cisco Wireless Control Module Version | Access Point Version |
|----------------------|-------------------|---------------------------------------|----------------------|
| 03.1.0SG | 15.0(1)XO | - | - |
| 03.1.1SG | 15.0(1)XO1 | - | - |

Table 8 Cisco IOS XE to Cisco IOS

| Cisco IOS XE Version | Cisco IOS Version | Cisco Wireless Control Module Version | Access Point Version |
|----------------------|-------------------|---------------------------------------|----------------------|
| 03.2.0SG | 15.0(2)SG | - | - |
| 03.3.0SG | 15.1(1)SG | - | - |
| 03.3.1SG | 15.1(1)SG1 | - | - |
| 03.4.0SG | 15.1(2)SG | - | - |
| 03.5.0E | 15.2(1)E | - | - |
| 03.6.0E | 15.2(2)E | - | - |
| 03.7.0E | 15.2(3)E | 10.3.100.0 | 15.3(3)JNB |

Wireless Related Information

- [Wireless Web UI Software Requirements, page 38](#)
- [Access Points and Mobility Services Engine, page 38](#)
- [Compatibility Matrix, page 40](#)
- [Interoperability with Other Client Devices, page 40](#)
- [Important Notes, page 42](#)

Wireless Web UI Software Requirements

- Operating Systems
 - Windows 7
 - Windows 8
 - Mac OS X 10.8
- Browsers
 - Google Chrome—Version 35
 - Microsoft Internet Explorer—Versions 10 or 11
 - Mozilla Firefox—Version 30
 - Safari—Version 6.1

Access Points and Mobility Services Engine

Table 9 lists the supported products for the wireless features.

Table 9 Supported Wireless Products

| Product | Platform Supported |
|--------------------------|---|
| Access Point | Cisco Aironet 700, 700W, 1040, 1140, 1260, 1530, 1570, 1600, 1700, 2600, 2700, 3500, 3600, 3700 |
| Mobility Services Engine | 3355, Virtual Appliance |

Table 10 lists the specific supported Cisco access point models.

Table 10 Supported Access Points

| Access Points | |
|---------------------------|--------------------|
| Cisco Aironet 700 Series | AIR-CAP702W-x-K9 |
| | AIR-CAP702I-x-K9 |
| | AIR-CAP702I-xK910 |
| Cisco Aironet 700W Series | AIR-CAP702Wx-K9 |
| | AIR-CAP702W-xK910 |
| Cisco Aironet 1040 Series | AIR-AP1041N |
| | AIR-AP1042N |
| | AIR-LAP1041N |
| | AIR-LAP1042N |
| Cisco Aironet 1140 Series | AIR-AP1141N |
| | AIR-AP1142N |
| | AIR-LAP1141N |
| | AIR-LAP1142N |
| Cisco Aironet 1260 Series | AIR-LAP1261N |
| | AIR-LAP1262N |
| | AIR-AP1261N |
| | AIR-AP1262N |
| Cisco Aironet 1530 Series | AIR-CAP1532I-x-K9 |
| | AIR-CAP1532E-x-K9 |
| Cisco Aironet 1570 Series | AIR-AP1572EAC-A-K9 |
| | AIR-AP1572ECx-A-K9 |
| | AIR-AP1572ICx-A-K9 |
| Cisco Aironet 1600 Series | AIR-CAP1602E |
| | AIR-CAP1602I |
| Cisco Aironet 1700 Series | AIR-CAP1702I-x-K9 |
| | AIR-CAP1702I-xK910 |
| Cisco Aironet 2600 Series | AIR-CAP2602E |
| | AIR-CAP2602I |

Table 10 Supported Access Points (continued)

| Access Points | |
|---------------------------|-------------------|
| Cisco Aironet 2700 Series | AIR-CAP2702I-x-K9 |
| | AIR-CAP2702E-x-K9 |
| Cisco Aironet 3500 Series | AIR-CAP3501E |
| | AIR-CAP3501I |
| | AIR-CAP3501P |
| | AIR-CAP3502E |
| | AIR-CAP3502I |
| | AIR-CAP3502P |
| Cisco Aironet 3600 Series | AIR-CAP3602E |
| | AIR-CAP3602I |
| Cisco Aironet 3700 Series | AIR-CAP3702I |
| | AIR-CAP3702E |
| | AIR-CAP3702P |

Compatibility Matrix

Table 11 lists the software compatibility matrix.

Table 11 Software Compatibility Matrix

| Cisco 5700 WLC | Catalyst 3850 | Catalyst 3650 | Catalyst 4500E with Sup 8-E | Cisco 5508 WLC or WiSM2 | MSE | ISE | ACS | Cisco PI |
|----------------|---------------|---------------|-----------------------------|-------------------------|-----|-----|------------|----------|
| 03.07.00E | 03.07.00E | 03.07.00E | 03.07.00E | 8.0 7.6 | 8.0 | 1.3 | 5.2 5.3 | 2.2 |

For more information on the compatibility of wireless software components across releases, see the [Cisco Wireless Solutions Software Compatibility Matrix](#).

Interoperability with Other Client Devices

This section describes the interoperability of this version of the switch software release with other client devices.

Table 12 lists the client types on which the tests were conducted. The clients included laptops, handheld devices, phones, and printers.

Table 12 **Client Types**

| Client Type and Name | Version |
|---|-------------------------------------|
| Laptop | |
| Intel 4965 | 11.5.1.15 or 12.4.4.5, v13.4 |
| Intel 5100/6300 | v14.3.0.6 |
| Intel 6205 | v15.10.5.1 |
| Intel 6235 | V15.10.5.1 |
| Intel 6300 | v15.10.4.2 |
| Intel 7260(11AC) | 17.0.0.34, Windows 8.1 |
| Dell 1395/1397 | XP/Vista: 5.60.18.8 Win7: 5.30.21.0 |
| Dell 1505/1510/Broadcom 4321MCAG/4322HM | 5.60.18.8 |
| Dell 1515 (Atheros) | 8.0.0.239 |
| Dell 1520/Broadcom 43224HMS | 5.60.48.18 |
| Dell 1530 (Broadcom BCM4359) | v5.100.235.12 |
| Cisco CB21 | v1.3.0.532 |
| Atheros HB95 | 7.7.0.358 |
| MacBook Pro (Broadcom) | 5.10.91.26 |
| Broadcom 4360(11AC) | 6.30.163.2005 |
| Macbook Air (11AC) | 10.9.3 |
| Macbook Air | 10.9.3 |
| Handheld Devices | |
| Apple iPad | iOS 5.0.1 |
| Apple iPad2 | iOS 6.0.1 |
| Apple iPad3 | 8.0.2(12A405) |
| Apple iPad Air | 8.0.2(12A405) |
| Apple iPad Mini | 8.0.2(12A405) |
| Samsung Galaxy Tab | Android 3.2 |
| Intermec CK70 | Windows Mobile 6.5 / 2.01.06.0355 |
| Intermec CN50 | Windows Mobile 6.1 / 2.01.06.0333 |
| Symbol MC5590 | Windows Mobile 6.5 / 3.00.0.0.051R |
| Symbol MC75 | Windows Mobile 6.5 / 3.00.2.0.006R |
| Phones and Printers | |
| Cisco 7921G | 1.4.2.LOADS |
| Cisco 7925G | 1.4.2.LOADS |
| Ascom i75 | 1.8.0 |
| Spectralink 8030 | 119.081/131.030/132.030 |
| Vocera B1000A | 4.1.0.2817 |
| Vocera B2000 | 4.0.0.345 |

Table 12 **Client Types (continued)**

| Client Type and Name | Version |
|------------------------------|-----------------------|
| Apple iPhone 4 | iOS 6.0.1 |
| Apple iPhone 4S | 8.0.2(12A405) |
| Apple iPhone 5s | 8.0.2(12A405) |
| Apple iPhone 5c | 8.0.2(12A405) |
| Apple iPhone 6 | 8.0.2(12A405) |
| Ascom i62 | 2.5.7 |
| HTC Sensation | Android 2.3.3 |
| Samsung Galaxy S II | Android 2.3.3 |
| SpectraLink 8450 | 3.0.2.6098/5.0.0.8774 |
| Samsung Galaxy Nexus | Android 4.0.2 |
| Samsung Galaxy S4 (GT-I9500) | 4.4.2 |
| Samsung Galaxy Note (SM-900) | 4.4.2 |

Important Notes

- Software expand running command is not available. We recommend that you use software expand file command instead.
- Redundancy mode rpr is not available in wireless enabled mode.
- Location keyword to fetch the data from active/active-dc/stby/stby-dc
- Wireless mode shows dc boot status and errors (if any) during boot up.

Status (Success):

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(<http://www.gnu.org/licenses/gpl-2.0.html>) For more details, see the documentation or "License Notice" file accompanying the IOS-XE software, or the applicable URL provided on the flyer accompanying the IOS-XE software.

```
# # ## ##### # # # # # #####
# # # # # # ## # # ## # # #
# # # # # # # # # # # # # #
# ## # ##### ##### # # # # # ##
## ## # # # # ## # # ## # #
# # # # # # # # # # # # #####
```

```
Daughter Card is booting.. Please stand by.....
Daughter Card is ready, continuing in wireless mode..
```

- Default configurations and internal interfaces are created. Details on default policy-map:

```
*Dec 4 01:57:09.019: %LINK-3-UPDOWN: Interface Port-channel256, changed state to up
*Dec 4 01:57:11.359: %LINK-3-UPDOWN: Interface Port-channel255, changed state to up
```

```
Interfaces TengigabitEthernet <supervisor-slot#>/internal-port#
Internal port#: 9-16.
```

No configuration is allowed on internal interfaces.

Status/Stats of internal ports are visible under service internal command.

Boot Failure messages:

- DC communication failures:

```
Daughter Card is booting.. Please stand by.....
!!! DAUGHTER CARD BOOT FAILED (DC Boot base package timeout), REBOOTING..!!!
```

- DC Programming Failures:

```
Daughter Card is booting.. Please stand by.....
!!! DAUGHTER CARD BOOT FAILED (DC Bootloader upgrade failed), REBOOTING..!!!

!!! DAUGHTER CARD FPGA UPGRADE FAILED!(FPGA READ HANG),Rebooting.. !!!
!!! DAUGHTER CARD BOOT FAILED (BOOTLOADER UPGRADE SKIPPED), REBOOTING..!!!
```

- Unsupported License:

```
-----
WARNING!!

License level incompatible to bring up daughtercard

Daughter Card is disabled!

Activate ipbase or entservices license to enable daughtercard
-----
```

- Restrictions:
 - Supported only in ipbase and entservices license.
 - Supported only in install mode.
 - Supported only in cat4500es8-universalk9* (Crypto) images
 - Requires rommon version 15.1(1r)SG5 or later
 - Not supported in VSS
 - SUP7E mode not supported
- Daughter card logs/crashinfo
 - DC bootup logs are stored in bootflash (max 5 files, 1 per reload) with **dc_console_log-yyyymmdd-hhmmss-UTC** format.
 - After DC becomes operational, the logs are forwarded to BB's syslog. DC logs have a prefix of DC-SLOT<slot-no>:
 - DC crash info and system reports are stored at crashinfo-dc: and slavecrshinfo-dc: for active-dc and stby-dc respectively
- DC can be disabled in install boot via “hw-module daughtercard disable” configuration. However, you must save the configuration and reload the system for this to take effect.

- AP Joining the WLC:
 - A new AP, which has only factory default configurations, sends an L3 Broadcast Discovery message to learn and discover a WLC. Then the WLCs in the broadcast domain respond to this request. This request also has the number of APs they can support and how many APs are currently connected. The AP then would send a Join message to the least loaded WLC among the list.
 - When there is an explicit primary WLC IP address configured on the AP, the AP sends a unicast WLC discovery message to this specific WLC. There could also be WLCs that the AP learned about in its past associations with the WLCs and it would send a Unicast Discovery to these WLCs too. After the WLCs respond to this query, it matches with the primary WLC name and IP address and if the match is found, it will join the WLC. If there is an invalid WLC name or IP, then it will not match and it will join the other WLCs that would have responded to the unicast query. If no other WLC responded to the AP, it would send an L3 broadcast discovery message again.
 - There is a difference in behavior between how the Sup 8-E based MA or MC handles the Unicast L3 Discovery packet as compared to the Catalyst 3850 Switch in MA or MC mode.

On Catalyst 3850 Switches—Any packet received on the management VLAN is terminated and not forwarded to the unicast IP address in the discovery even if the address does not belong to itself. When a primary base IP of the WLC is configured, the MA does not forward the unicast packets and the AP therefore falls back to sending a broadcast discovery packet which terminates on the Catalyst 3850 Switch.

On Sup 8-E—On the Sup 8-E MA, however, the unicast discovery packet, if received on the management VLAN, is forwarded to the right destination based on the IP address in the discovery packet. Therefore, it reaches the destined WLC and joins it and not the SUP 8-E if the destination IP address is other than the SUP 8-E itself. This results in AP joining the MC and not the MA.

Upgrading the System Software

If you are upgrading to Cisco IOS XE Version 3.7.xE and plan to use VSS, you must upgrade your ROMMON to version 15.0(1r)SG10. Otherwise, you must upgrade your ROMMON to at least Version 15.0(1r)SG2.

For details on how to upgrade ROMMON, refer to:

: http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/release/note/OL_3030_6-01.html

If you are upgrading to Cisco IOS XE 3.7.xE and using Supervisor Engine 7-E or 7L-E, you must use ROMMON version 15.0(1r)SG10 or a higher version (if available).

If you are upgrading to Cisco IOS XE 3.7.xE and using Supervisor Engine 8-E, you must use ROMMON version 15.1(1r) SG5 or later, version or a higher version (if available).



Note If dual supervisor engines are present, first upgrade your software to Cisco IOS XE 3.2.0SG or higher, then upgrade your ROMMON to version 15.0(1r)SG7 to avoid an uplinks issue (CSCtj54375).

**Note**

When you upgrade to Cisco IOS XE Release 3.7.5E, SSH access is lost, because it cannot use the CISCO_IDEVID_SUDI_LEGACY RSA server key. Before upgrade, generate the server key using the **crypto key generate rsa** command in global configuration mode. To verify whether the RSA server key is available on your device, run the **show crypto key** command.

Identifying Hardware Revisions on the Switch Chassis

The Cisco Catalyst 4507R-E Switch chassis that has hardware revision 2.0 or higher supports Supervisor Engine 8-E. Before you install Supervisor Engine 8-E on the Catalyst 4507R-E Switch chassis, enter the **show idprom chassis** privileged EXEC command on the existing switch chassis to know its current revision number.

The following is a sample output of the **show idprom chassis** command on a Catalyst 4507R-E Switch. Note the “Hardware Revision” field here is “2.0”:

```
Switch# show idprom chassis
Chassis Idprom :
  Common Block Signature = 0xABAB
  Common Block Version = 3
  Common Block Length = 144
  Common Block Checksum = 3874
  Idprom Size = 256
  Block Count = 4
  FRU Major Type = 0x4001
  FRU Minor Type = 52
  OEM String = Cisco
  Product Number = WS-C4507R-E
  Serial Number = FOX1224G5ZH
  Part Number = 73-9975-04
  Part Revision = D0
  Manufacturing Deviation String =
Hardware Revision = 2.0
  Top Assembly Number = 800-26494-01
  Top Assembly Revision Number = D0
<output truncated>
```

Upgrading ROMMON Image for Supervisor Engine 8-E

For IOS XE Release 3.7.xE, the ROMMON image must be upgraded to use version 15.1(1r)SG5. The IOS XE Bundle format for Supervisor Engine 8-E has changed, necessitating a new ROMMON image.

The following [error] messages might be observed if IOS XE 3.7.xE images are booted with older ROMMON images:

```
rommon 1 > boot bootflash:cat4500es8-universalk9.SPA.03.06.00.E.152-2.E.bin
File has bad file magic number: 0x0. Is it a valid file?
boot: cannot load "bootflash:cat4500es8-universalk9.SPA.03.06.00.E.152-2.E.bin?";

rommon 10 > boot tftp://172.18.121.121/cat4500es8-universalk9.SPA.03.06.00.E.152-2.E.bin
Link Speed : 100Mb Full Duplex
Filename : /cat4500es8-universalk9.SPA.03.06.00.E.152-2.E.bin
IpAddress : 10.122.161.35
TftpServer : 172.18.121.121
TftpBlkSize : 1468
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
File Size : 199051336
MD5 : a32df24fdfc54776f20d83c092f24496
```

```
Unsigned image, or verification is disabled!
Image Error!!!!
```

Identifying an +E Chassis and ROMMON

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.

Limitations and Restrictions

- If WLAN applied client policy is invalid, the client is excluded with the exclusion reason being 'Client QoS Policy failure'.
- The maximum MTE supported on Catalyst 4500 switches is 8000, per direction.
- Although the **show memory** command is supported on Catalyst 4500 series switches, the CLI output for the command shows the value 0 for config total, on Catalyst 4500 series switches using a daughter card on Supervisor Engine 7-E. This issue is, however, not seen on switches with Supervisor Engine 7-E baseboard. (CSCup28930)
- The system allows you to delete policy maps related to these Auto QoS profiles:
 - Auto QoS enterprise
 - Auto QoS guest
 - Auto QoS voice

The problem is seen on a Catalyst 4500 series switch running Cisco IOS-XE release 3.7.0E, when you configure QoS using Auto QoS and you try to delete an Auto QoS profile related policy map.

Workaround: To recover the deleted policy-map, remove all the policies related to that profile, remove Auto QoS configuration from the WLAN, and then reconfigure Auto QoS.

- Dot1x PEAP based authentication for wireless clients on Supervisor Engine 8-E is 3 auths/sec.
- Indirectly connected access points are not supported. Only access points directly connected to a trunk or access port is supported. On connecting more than one AP the following error message will be seen:


```
3.Dec 5 03:57:24.121: %CAPWAP-3-ONE_AP_PER_PORT: AP (mac:6c20.56a6.4fc4) is not
allowed on port:Po2. Only one AP per port is allowed.
```
- RPR mode cannot be configured when Supervisor Engine 8-E is booted in wireless mode.
- Flow Sampling is not supported on Supervisor Engine 8-E.
- Supported QoS features on wireless targets: The detailed QoS policy is the same as mentioned here: http://www.cisco.com/c/en/us/td/docs/wireless/controller/5700/software/release/3e/qos/configuration_guide/b_qos_3e_5700_cg/b_qos_3e_5700_cg_chapter_011.html#concept_47CC8E2ACA2E44489B9BB7068FCD0649), except that the port policy cannot be changed because it is a DC-interconnect port.

- VSS: Do not use SVLAN for routing in SP network on ingress switch (where the mapping is present). This is not a valid scenario.
- VSS is not supported in Wireless mode, on Supervisor Engine 8-E.
- Wired guest access does not work on Supervisor Engine 8-E, in multi-host or multi-authentication mode.
- The **show exception files all** command lists only crashinfo files from the active supervisor engine. You must issue the **dir slavecrashinfo:** and **dir slvecrashinfo-dc:** commands to obtain lists of crashinfo files from the standby supervisor engine.
- Performing an ISSU from a prior release to IOS XE 3.6.0E 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.
- 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 $65536 \times 512 = 32$ 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>
```

CSCt93278

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

- If the number of unique FNF monitors attached to target exceeds 2048 (one per target), a switch responds slowly:

Workarounds:

- Decrease the number of monitors.
- Attach the same monitor to multiple targets. CSCti43798

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

Workaround: Use the **dir device** command (for example, **dir bootflash:**) to obtain the correct file count. CSCti74130

- If multicast is configured and you make changes to the configuration, Traceback and CPUHOG messages are displayed if the following conditions exist:

- At least 10K groups and roughly 20K mroutes exist.
- IGMP joins with source traffic transit to all the multicast groups.

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

- With traffic running, entering **clear ip mroute *** with larger number of mroutes and over 6 OIFs will cause Malloc Fail messages to display.

You cannot clear a large number of mroutes at one time when traffic is still running.

Workaround: Do not clear all mroutes at once.

CSCtn06753

- 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.

- 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 XE Release 3.2.3:

- 10/100/1000BaseT Premium POE E Series WS-X4648-RJ45V+E (JAE1348OY52)
- 4 Sup 7-E 10GE (SFP+), 1000BaseX (SFP) WS-X45-SUP7-E (CAT1434LOG4)

the following restrictions apply:

- Sub-interfaces 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.
- 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
```

CSCt106706

- 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

- 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.

You will not experience this behavior with IPv4 access lists.

Workaround: During IPv6 access-list configuration, configure at least one IPv6 ACE before the "hardware statistics" statement. CSCuc53234

- Routed packets that are fragmented are not policed if the egress interface is on the VSS Standby switch. However, if the egress interface is on the VSS Active switch, these packets are policed.

This applies to QoS policing only. QoS marking, shaping and sharing behave as expected.

Workaround: None. CSCub14402

- When an IPv6 FHS policy is applied on a VLAN and an EtherChannel port is part of that VLAN, packets received by EtherChannel (from neighbors) are not bridged across the local switch.

Workaround: Apply FHS policies on a non EtherChannel port rather than a VLAN. CSCua53148

- During VSS conversion, the switch intended as the Standby device may require up to 9 minutes to reach an SSO state. The boot up time depends on the configuration and on the number of line cards in the system.

Workaround: None. CSCua87538

- Dual connectors (like, an SFP+ transceiver inserted into a CVR-X2-SFP10G module) on the WS-X4606-X2-E line card are not supported as a VSL.

Workaround: Use any X2-pluggable module on its own in the WS-X4606-X2-E line card. CSCuc70321

- Memory allocation failures can occur if more than 16K IPv6 multicast snooping entries are present.

Workaround: None. CSCuc77376

- The **show interface capabilities** command output does not show the correct linecard model.

Workaround: Observe the **show module** command output. CSCua79513

- Beginning with IOS Release XE 3.5.0E, error messages that occur when a QoS policy is applied will no longer appear directly on the console when **no logging console** is configured. They will appear only when a logging method is active (e.g., logging buffered, logging console, ...).

Workaround: None. CSCuf86375

- Setting a cos value based on QoS group triggers the following error message in a VSS system

```
set action fail = 9
```

Workaround: None. QoS groups are not supported in VSS. CSCuc84739

- Auto negotiation cannot be disabled on the Fa1 port. It must be set to auto/auto, or fixed speed with duplex auto.
- The following messages are seen during boot up after POST check.

```
Rommon reg: 0x00004F80
Reset2Reg: 0x00000F00
```

```
Image load status: 0x00000000
####
Snowtrooper 220 controller 0x0430006E..0x044E161D Size:0x0057B4C5 Program Done!
#####
[ 6642.974087] pci 0000:00:00.0: ignoring class b20 (doesn't match header type 01)
Starting System Services
Calculating module dependencies ...
Loading rtc-ds1307
RTNETLINK answers: Invalid argument
No Mountpoints DefinedJan 17 09:48:14 %IOSXE-3-PLATFORM: process sshd[5241]: error:
Bind to port

22 on :: failed: Address already in use
Starting IOS Services
Loading virtuclock as vuclock
Loading gsbu64atomic as gdb64atomic
/dev/fd/12: line 267: /sys/devices/system/edac/mc/edac_mc_log_ce: No such file or
directory
Aug 8 20:30:29 %IOSXE-3-PLATFORM: process kernel: mmc0: Got command interrupt
0x00030000 even though no command operation was in progress.

Aug 8 20:30:29 %IOSXE-3-PLATFORM: process kernel: PME2: fsl_pme2_db_init: not on
ctrl-plane
```

These messages are cosmetic only, and no ssh services are available unless configured within IOS.

Workaround: None CSCue15724

- When a logging discriminator is configured and applied to a device, memory leak is seen under heavy syslog or debug output. The rate of the leak is dependent on the quantity of logs produced. In extreme cases, the device may crash. As a workaround, disable the logging discriminator on the device (CSCur45606, CSCur28336).

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

Cisco Bug Search Tool

The Bug Search Tool (BST), which is the online successor to Bug Toolkit, is designed to improve the effectiveness in network risk management and device troubleshooting. The BST allows partners and customers to search for software bugs based on product, release, and keyword, and aggregates key data such as bug details, product, and version. The tool has a provision to filter bugs based on credentials to provide external and internal bug views for the search input.

To view the details of a caveat listed in this document:

1. Access the BST (use your Cisco user ID and password) at <https://tools.cisco.com/bugsearch/>.
2. Enter the bug ID in the **Search For:** field.

Open Caveats for Cisco IOS XE Release 3.7.xE

Table 13 *Open Caveats*

| Bug ID | Headline |
|------------|--|
| CSCvc53017 | Inconsistent application of 'no cdp enable' on VSL links during VSS setup |
| CSCva34189 | ISSU aborts when Old-Active runs out of space during commit version |
| CSCuy05126 | ISSU: Sup8-E wireless ISSU failed with rolled back to RPR |
| CSCun87486 | Power supply in Bad state on OIR on WS-X4748-RJ45V+E WS-X4748-UPOE+E |
| CSCuq28761 | Loading 3.6.3E/15.2(2)E3 image where the VLAN name has 128 characters crashes the Supervisor Engine 7-E HA |
| CSCur71547 | VRF-aware PBRv6 traffic drops when next-hop is configured with tunnel interfaces |
| CSCur92675 | ACL hardware flattening fails for more than 250 Deny ACES on route-map |
| CSCus50485 | SDN VMAN OFA log error is observed when OFS configuration is removed using the no openflow command |
| CSCut34151 | Removing port from OFA leads to system crash |
| CSCut81133 | Modifying default flow through controller has issues |
| CSCuv15017 | VSS Active Reload causes CTS Ether-channel links on standby to flap |
| CSCuw09295 | I/O Pool memory leak in igmpsn_mrd_handle_igmp_pak |
| CSCuw10936 | APs not rejoining 4500 VSS following sso with DTLS enabled |

Resolved Caveats for Cisco IOS XE Release 3.7.3E

Use the Bug Search Tool to view the details of a caveat listed in this section:

Table 14 *Resolved Caveats in IOS XE release 3.7.3E*

| Bug ID | Headline |
|------------|---|
| CSCur09885 | Route is not installed for L2 MEC port channel on standby Sup in VSS. |
| CSCur10293 | Counters on tunnel are not incrementing |

Table 14 *Resolved Caveats in IOS XE release 3.7.3E*

| Bug ID | Headline |
|---------------|---|
| CSCur23262 | Removing 8 queues with AQC enabled removes the auto-QOS CFG |
| CSCur45606 | logging discriminator doesn't work |
| CSCur61648 | On Sup8E, daughter card FPGA upgrade fails and keeps rebooting |
| CSCus17795 | Same port name displays in lower and upper case during OpenFlow configuration |
| CSCus82677 | Openflow config shows up multiple times in show running |
| CSCut06025 | Link does not show Link Up status at one end on GLC-GE-100FX |
| CSCut14397 | Bad parsing when keyword is truncated during OpenFlow LXC configuration |
| CSCut44062 | 5GHz and 2.4GHz radios are shut when Sup8E is reloaded |
| CSCut55195 | Mobility tunnel not coming up with L3 interface |
| CSCut71405 | IGMP packet not matched by ingress QoS policy if IGMP Snooping enabled |
| CSCut74192 | bfd session not coming up after interface in vrf shut and no shut |
| CSCuu25770 | IOSd crash triggered by certain CDP packet |
| CSCuu38969 | SUP7E can restart if verify command is executed on corrupted IOS image |
| CSCuu68776 | Multicast boundary filter-autorp broken / WS-C4500X / 15.2(1)E 15.2(3)E1 |
| CSCuu89948 | upolicer action issues with mixed traffic hitting wrong action |
| CSCuu92757 | 4500 Sup8 MAB not triggered with "authentication control-direction in" |
| CSCuu97116 | Acct messages should include Class attribute from authentication |
| CSCuu97550 | 4500X - SNMP dot1dTpFdbPort retuning incorrect value |
| CSCuv07796 | Truncated output of 'show platform cpu packet buffered' |
| CSCuv23475 | CPUHOG and crash on "no network 0.0.0.0" with vnet configuration on intf |
| CSCuv26804 | Iosd Crash with dhcp snooping enabled |
| CSCuv32845 | no message display even unable to allocate memory for vlan mapping |
| CSCuv76906 | "bfd" disappears after issuing "snmp-server host x.x.x.x ABC bfd" |
| CSCuv79184 | Optical tx power output detected on admin down port of C4500X. |
| CSCuv87828 | 4500x OG/ACL modification crash due to chunk corruption - FFM: ACL Stats |
| CSCuv96230 | 4500X Crash due to object-group addition/removal |
| CSCuw06073 | EOL CRLF in startup-config breaks 4500x VSS |
| CSCuw09327 | Crash while config ACL- invalid mem access K5CpuEventCodeInputAclCopy |
| CSCuw19907 | FB Crash while config ACL on C4500X |
| CSCuw28638 | 3650 Rebooting during EAP-TLS authentication |
| CSCuw39020 | access-session vlan-assignment ignore-errors breaks dynamic vlan assign |
| CSCuw50273 | WS-X4640-CSFP-E drops packets inbound |
| CSCuw58095 | 15.2(2)E3/3.6.3E: SUP8E crash at dot1x_switch_handle_vlan_removal |
| CSCuy64537 | %C4K_HWFLOWMAN-4-NFEFUINTRRUPT: NFE FU FnfWatermark interrupt |

Resolved Caveats for Cisco IOS XE Release 3.7.2E

Use the Bug Search Tool to view the details of a caveat listed in this section:

Table 15 *Resolved Caveats in IOS XE Release 3.7.2E*

| Bug ID | Headline |
|------------|--|
| CSCur01407 | ISSU load version trigger ISSU-3-FSM_MISMATCH_MTU traceback |
| CSCut78588 | OpenFlow flow statistics do not work after line card reset |
| CSCus76999 | ISSU upgrade failed between 3.7.0E and 3.7.1E in Alpha |
| CSCup47347 | Switch reloads when TCAM is full with IPV4 routes |
| CSCut09985 | VSL link stuck in W state, when OIR is done on the SFP of the VSL link, |
| CSCut77897 | Crash when stress test-700fps in hybrid mode with L2/L3 features |
| CSCut70182 | Default flow shows big value for packets on bootup |
| CSCus29378 | The show openflow hardware capabilities command displays wrong values |
| CSCus65650 | Open flow CLI commands are not working with daughter card enabled |

Resolved Caveats for Cisco IOS XE Release 3.7.1E

Use the Bug Search Tool to view the details of a caveat listed in this section:

Table 16 *Resolved Caveats in IOS XE Release 3.7.1E*

| Bug ID | Headline |
|------------|---|
| CSCut07355 | Enable WS-X4548-RJ45V+ WS-X4248-RJ45V WS-X4548-GB-RJ45V for Sup 7-E or 7-LE |
| CSCup01820 | DSCP tag getting erased on VSS standby port with qinq |
| CSCuq15716 | SSTE: SUP8-E Wireless, Redundancy mode RPR doesn't work |
| CSCur85215 | VSS standby VSL link config not sync to Active once VSS comes up |
| CSCup68272 | The last heard time of rogue does not match the system clock |
| CSCuq31722 | CLI show platform software floodprofile caused SUP8 to crash |
| CSCur23413 | High CPU and traceback seen at ip_adm_sm_delete_proxy_info |
| CSCur72843 | Sup8-E APs drop after redundancy force-switchover |

Resolved Caveats for Cisco IOS XE Release 3.7.0E

Use the Bug Search Tool to view the details of a caveat listed in this section:

Table 17 *Resolved Caveats*

| Bug ID | Headline |
|------------|--|
| CSCuq32728 | 3.6.0 - IP phones reboots continuously |
| CSCun43007 | Sup7E IOSd Crash in GalK5DfeMan.cxx with 3.6.0 |

Table 17 *Resolved Caveats (continued)*

| Bug ID | Headline |
|---------------|--|
| CSCuq04574 | WS-C4500X-16 with 3.5.3E crashes due to SNMP polling |
| CSCuo80260 | Call-home message fails; returns "Unknown" serial number |
| CSCup71438 | 4k switch returns amount of RAM memory in Mbytes instead of bytes |
| CSCul29298 | peer interface LinkDown message delay when shutting down C4500X's port |
| CSCuq09636 | Single bit error corrected on Sup7-E is inadvertently logged in syslog |
| CSCun72360 | %SFF8472-5-THRESHOLD_VIOLATION not output if no switchport configured |
| CSCun13984 | The switch reloads while modifying static mac address-table entry |
| CSCup39712 | Switch crashes with critical software exception during config push |
| CSCup48832 | Identical IPv6 DHCP remote ID for L2 ports running source-guard/snooping |
| CSCuq03562 | PBR: Not working in XE 3.5.0E under IPBASE license |
| CSCur34151 | switch crash with show platform logfeature |
| CSCuc03836 | Switch reports SYS-2-MALLOCFAIL error for a very large amount of memory |
| CSCui99162 | ARP response for ARP probe flooded through VLAN, ip device tracking |
| CSCuq04533 | Cost for secondary vlans is lost after each reload |
| CSCua59292 | Implement Indus ACL enhancements for PBR |
| CSCun99636 | Standby Supervisor Stuck on Reload in 4k VSS due to SNMP Server traps |
| CSCun34745 | "ip ssh source-interface" configuration missing after reload |
| CSCuo66933 | Switch sent Failure packet after reboot and caused PC to fail authen |
| CSCum27170 | Cannot poll VRF routes using ipCidrRouteTable |
| CSCun05118 | DHCP client doesn't work on management interface fa1 |
| CSCuo62332 | CISCO-BGP-MIBv8.1 - Add support for cbgpPeer2Type in BGP traps/notif |
| CSCug77784 | File table overflow: private-config file open fails |
| CSCup17529 | Cat4k crashes at EPM after executing show ip device tracking all |
| CSCuo67770 | crash at ipv6_nd_ra_desc_is_final |
| CSCup23083 | SCP support for vrf copy feature |
| CSCse19848 | Multicast and broadcast SNMP counters are not populated for some interf. |
| CSCup08161 | Stacklow crash when copying file via SNMP |
| CSCuo31164 | match prefix is removed from SNMP V3 configuration after host command |
| CSCup22590 | Multiple Vulnerabilities in IOS/IOSd OpenSSL - June 2014 |
| CSCuh17594 | UDP Jitter probes may return erroneously low or high RTT values |
| CSCup42385 | HA fails due to Bulk sync failure with encrypted password |

Related Documentation

Refer to the following documents for additional Catalyst 4500 series information:

- [Catalyst 4500 Series Switch Documentation Home](#)

<http://www.cisco.com/en/US/products/hw/switches/ps4324/index.html>

- Catalyst IOS-XE Release 3E Documentation Roadmaps

<http://www.cisco.com/c/en/us/support/ios-nx-os-software/ios-xe-3e/products-documentation-roadmaps-list.html>

Hardware Documents

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

- *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/docs/switches/lan/catalyst4500/hardware/configuration/notes/OL_25315.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

Software Documentation

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

- Catalyst 4500E release notes are available at:

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

Software documents for the Catalyst 4500 Classic, Catalyst 4500 E-Series, Catalyst 4900 Series, and Catalyst 4500-X Series 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>

Commands in Task Tables

Commands listed in task tables show only the relevant information for completing the task and not all available options for the command. For a complete description of a command, refer to the command in the *Catalyst 4500 Series Switch Cisco IOS Command Reference*.

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