



Cisco Catalyst 4500 and 4900 Series Switches for Service Providers

Centralized Architecture with CenterFlex Technology

Cisco® Catalyst® 4500 Series Switches employ a centralized architecture where each packet is transported to the active supervisor engine to be switched. This architecture helps ensure consistent high performance while protecting the investment in line cards. CenterFlex technology on the supervisor engine is enabled by custom-designed application-specific integrated circuits (ASICs) and ternary content addressable memory (TCAM), which are crucial to feature richness, configuration flexibility, and line-rate performance. The architecture is designed with a large amount of dedicated TCAM space for each function and feature, helping ensure high performance. The Catalyst 4900 Series switches employ the same architecture as the Catalyst 4500 series in a fixed form factor, giving service providers the flexibility of deploying in smaller locations where port density requirement is lower.

Service Provider Deployments

Both the Cisco Catalyst 4500 and 4900 Series Switches offer high-performance Layer 2 and Layer 3 switching for service provider aggregation and access deployments. The Catalyst 4500 Series is used for broadband service aggregation (DSL or passive optical network) and fiber-to-the-home (FTTH) deployments. The flexible, high-performance system allows service providers to build flexible and scalable networks to accommodate data, voice, and video services.

Figure 1. Cisco Catalyst 4500 Series Switch Product Line



Table 1. Cisco Catalyst 4500 Series Switch Product Line

Chassis	Supervisor Engine Slots	Line Card Slots	Maximum Ports
Cisco Catalyst 4503E Switch	1	2	116
Cisco Catalyst 4506E Switch	1	5	242
Cisco Catalyst 4507R-E Switch	2	5	244
Cisco Catalyst 4510R-E Switch	2	8	388

Figure 2. Cisco Catalyst 4900 Series Switch Product Line



Table 2. Cisco Catalyst 4900 Series Switch Product Line Comparison

Models	10 Gigabit Ethernet Uplink	Gigabit Ethernet Uplink	Tributary Ports
Cisco Catalyst 4900M Switch	8	0	40 10/100/1000 BASE-T or 32 10/100/1000 SFP or 16 2:1 oversubscribed 10GE or 8 1:1 10GE
Cisco Catalyst 4948 Switch		4	48 10/100/1000 BASE-T
Cisco Catalyst 4948 10 Gigabit Ethernet Switch	2		48 10/100/1000 BASE-T
Cisco ME 4924-10GE Switch	2	4	24 Gigabit Ethernet Small Form-Factor Pluggable (SFP)

Cisco Catalyst 4500 Series Supervisor Engines

- Cisco Catalyst 4500 Series Supervisor Engine 6-E:** Supports 320-Gbps, 250-mpps performance capacity. Supports up to 388 ports in the Cisco Catalyst 4510R-E chassis; large TCAM resources allow for high feature capacity. Supports IPv6 in hardware and both E-Series and classic line cards. Designed for IPv4 or IPv6 Layer 3 aggregation.
- Cisco Catalyst 4500 Series Supervisor Engine V-10GE:** Includes 10 Gigabit Ethernet uplinks and built-in enhanced NetFlow. Supports up to 388 ports in the Cisco Catalyst 4510R-E chassis. Supports only the classic line cards. Designed for IPv4 Layer 3 aggregation, Layer 2 aggregation, and FTTH access.
- Cisco Catalyst 4000/4500 Supervisor Engine V:** Includes gigabit uplinks with optional NetFlow and support for 342 ports in the Cisco Catalyst 4510R-E chassis. Supports only the classic line cards. Designed for IPv4 Layer 3 aggregation, Layer 2 aggregation, and FTTH access.
- Cisco Catalyst 4000/4500 Supervisor Engine IV:** Provides optional NetFlow and enhanced Layer 3 routing. Supported in the Catalyst 4503-E, 4506-E, and 4507R-E chassis. Supports only the classic line cards. Designed for IPv4 Layer 3 aggregation, Layer 2 aggregation, and FTTH access.
- Cisco Catalyst 4500 Series Supervisor Engine IIPlus-10GE:** Includes two 10 Gigabit Ethernet uplinks and four Gigabit Ethernet SFP uplinks. Supported in the 4503-E, 4506-E, and 4507R-E chassis. Supports only the classic line cards. Designed for Layer 2 aggregation and FTTH access.
- Cisco Catalyst 4500 Series Supervisor Engine II-Plus and Catalyst 4500 Series Supervisor Engine II-Plus-TS:** Provide enhanced Layer 2 features at an entry-level price. Support only the classic line cards. Designed for Layer 2 aggregation and FTTH.



Cisco Catalyst 4500 and 4900 Series Switches for Service Providers

Cisco Catalyst 4500 Series Line Cards

- **10 Gigabit Ethernet:** The 6-port E-Series 10 Gigabit Ethernet card (2.5:1) is available with X2 or twin gigabit optical connectors.
- **Gigabit Ethernet fiber:** Gigabit Ethernet fiber cards provide high-performance Gigabit Ethernet uplinks. Available in a variety of port counts and optical types (gigabit interface converter [GBIC] and SFP optics). The latest 24-port HQoS line card offers ingress hierarchical policing to effectively manage ingress traffic.
- **Gigabit Ethernet copper:** Available in 48-port E-Series with Power Over Ethernet (PoE) and classic versions with and without PoE.
- **Fast Ethernet fiber:** Support multimode and singlemode fiber and FX, LX, and BX transceivers.
- **Fast Ethernet copper:** Fast Ethernet line cards are available in 24- or 48-port counts and connection types, both with optional PoE.

Wire-Rate Switching

The centralized system architecture of the Cisco Catalyst 4500 Series supervisor engines offers Layer 2 and Layer 3 wire-rate switching performance with 10 Gigabit Ethernet uplink capacity. The supervisor engines support IEEE 802.1Q, Cisco QinQ bridging, and IPv4 routing. The Supervisor Engine 6-E also supports IPv6 routing.

High-Performance Multicast

On the Cisco Catalyst 4500 Series Switches and the Cisco Catalyst 4900 Series Switches, multicast is performed in hardware with software support for both Layer 2 and Layer 3 deployment. For efficient bandwidth utilization, Interior Gateway Management Protocol (IGMP) and Multicast Listener Discovery (MLD) Snooping are supported with Layer 2 deployment, and Protocol Independent Multicast dense mode (PIM-DM), PIM sparse mode (PIM-SM), and PIM PIM-SSM protocols are supported for Layer 3 deployment.

High Availability

For the modular Catalyst 4500 series, redundant power supplies, supervisor engines, fans combined with functionally transparent line cards, and Nonstop Forwarding (NSF) with Stateful Switchover (SSO) create a solid foundation to build a highly available network infrastructure. Full-image In-Service Software Upgrade (ISSU) further minimizes network disruptions, allowing upgrade or downgrade of complete Cisco IOS® Software images for new line cards, power supplies, features, or bug fixes with minimal to no service effect.

Network Security

The Cisco Catalyst 4500 Series supervisor engines and Cisco Catalyst 4900 Series Switches provide advanced detection and mitigation from Layer 2 and Layer 3 network attacks with no degradation in switching performance. The security foundation is based on hardware-enabled access control lists (ACLs), Control Plane Policing (CoPP), and a customer isolation (private VLAN) scheme.

Quality of Service

The Cisco Catalyst 4500 Series supervisor engines and Cisco Catalyst 4900 Series Switches support advanced QoS with low-latency queuing, per-port and per-VLAN policing, and priority marking. Traffic prioritization based on Ethernet priority bit (CoS) and IP diffserv (DSCP) allows data, voice, and video service combinations over a converged metro network infrastructure.