Cisco ME 6500 Series Ethernet Switch

The Cisco® ME 6500 Series Ethernet Switch is a next-generation, fixed-configuration switch built for space-optimized and power-constrained networks. Based on ground-breaking and industry-leading Cisco Catalyst® 6500 technology, the Cisco ME 6500 Series cost-effectively delivers on the stringent performance, reliability, and QoS requirements of next-generation enterprise WAN edge deployments in a space- and power-optimized 1.5-rack unit (1.5RU) package. The Cisco ME 6500 Series extends the most advanced Multiprotocol Label Switching (MPLS), quality of service (QoS), multicast, and IPv6 features into Ethernet access and aggregation networks, enabling scalable and service-rich Gigabit Ethernet access for both fiber and copper deployments.

Product Overview

The Cisco ME 6500 Series Ethernet Switch is a high-performance, fully featured, and resilient Ethernet switch, equipped standard with the Policy Feature Card 3C (PFC3C) and Multilayer Switch Feature Card 2A (MSFC2A).

The Cisco ME 6524 Ethernet Switch is the first available product of the Cisco ME 6500 Series.

The Cisco ME 6524 is available in two configurations:

- 24 Gigabit Ethernet Small Form-Factor Pluggable (SFP) downlinks and 8 Gigabit Ethernet SFP uplinks, with redundant power supplies (product ID ME-C6524GS-8S, Figure 1).

Figure 1. Cisco ME 6524 with 24 Gigabit Ethernet SFP Downlinks

- 24 Ethernet 10/100/1000 downlinks and 8 Gigabit Ethernet SFP uplinks, with redundant power supplies (product ID ME-C6524GT-8S, Figure 2).

Figure 2. Cisco ME 6524 with 24 Ethernet 10/100/1000 Downlinks

The Cisco ME 6524 Ethernet Switch is shipped with the IP Base Software image. The image includes the Layer 2 feature set, RIP, and EIGRP stub.

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For greater service breadth and network flexibility, the Cisco ME 6524 Ethernet Switch offers the IP Services license that provides IPv4 feature set, and the Advanced IP Services Software license that provides MPLS and IPv6 functionality.

The Cisco ME 6524 offers:

- Optimal Gigabit Ethernet density: With up to 32 Gigabit Ethernet ports, all fiber-based, the Cisco ME 6524 can aggregate multiple customers who require Gigabit Ethernet connectivity. The uplink interfaces offer flexible connectivity options by accommodating a broad range of SFP optics, including coarse wavelength-division multiplexing (CWDM) and dense wavelength-division multiplexing (DWDM) optics.
- Flexible network deployment options: The switch features highly scalable Layer 2 services with features such as intelligent 802.1Q tunneling and Layer 2 Protocol Tunneling. The PFC3C daughter card enables in-hardware MPLS technologies for MPLS VPNs, and Ethernet over MPLS (EoMPLS). For service offering facing an increasing demand for IP address space, hardware-enabled IPv6 protocols provide a scalable and high-performing end-to-end IP service delivery.
- Optimal performance and scalability: The Cisco ME 6524 offers high performance CPU for Layer 2 and Layer 3 protocols convergence and stability. The switch features scalable Layer 2 switching, IP routing and MPLS functionalities in hardware without performance impact.
- Increased service availability: The Cisco ME 6524 helps ensure service and network uptime with its support of Cisco EtherChannel protocols, rapid convergence protocols such as IEEE 802.1w/802.1s and Flexlink, and gateway load-balancing protocols. In order to minimize service outage due to a power supply failure, the Cisco ME 6524 can be configured with redundant DC, AC or a combination of AC and DC power supplies that are field-replaceable and hot-swappable.
- Integrated security: The Cisco ME 6524 offers a comprehensive set of security features to mitigate denial-of-service (DoS) attacks, to restrict the access to the network, and to safeguard network resources. Port-based and VLAN-based access control lists (ACLs) restrict the unwanted traffic based on traffic and users; CPU rate limiters and control plane policing (CoPP) limit the amount of traffic that enters the network; Port Security limits the number of MAC addresses that can be learned; DHCP Snooping and dynamic ARP inspection prevent threats from the DHCP server, default gateways, or address spoofing attacks. These integrated security features are hardware-enabled so they can be enabled concurrently without jeopardizing the system performance as the traffic level increases.

Applications

The Cisco ME 6524 offers hardware-accelerated VPN services for network segmentation and branches interconnectivity.

Layer 2 and Layer 3 VPNs

Layer 2 and Layer 3 VPNs have been widely deployed by enterprise and data center customers to offer network segmentation and consolidation. VPNs are well suited for applications such as interbranch connectivity, Internet access, intranets, and extranets.

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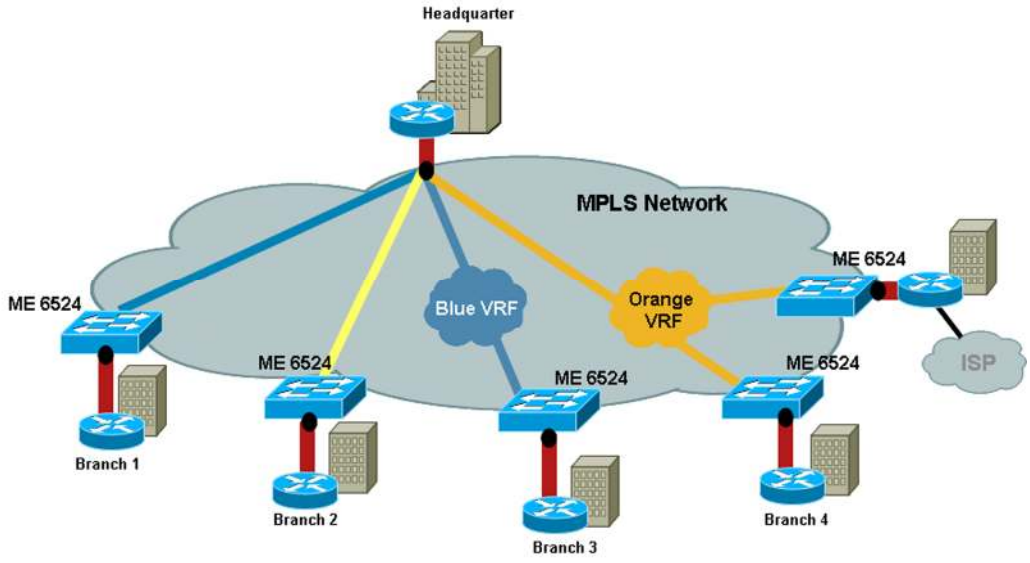
Layer 2 VPNs can be delivered over a pure Layer 2 infrastructure. By enabling features as 802.1Q tunneling and Layer 2 Protocol Tunneling (L2PT), the Cisco ME 6524 allows the customer to segment and transparently transport the users' traffic.

Alternatively, Layer 2 VPNs can be offered through Ethernet over MPLS. This technology provides a Layer 2 tunneling mechanism over a Layer 3 MPLS network, thus using the Layer 3 network convergence protocols without the need for Spanning Tree Protocol.

Layer 3 VPNs, often referred to as MPLS VPNs, are multipoint Layer 3 services (see Figure 3). The PFC3C complex on the Cisco ME 6524 enables MPLS in hardware and provides QoS and resiliency capabilities such as MPLS Experimental (MPLS EXP) bit marking, MPLS Traffic Engineering (MPLS TE), and MPLS Fast Reroute (MPLS FRR).

Figure 3. Cisco ME 6524 Supports Layer 2 and Layer 3 VPNs



Key Features and Benefits

Table 1 describes the features and benefits of the Cisco ME 6524, and Table 2 provides information about its scalability.

Table 1. Cisco ME 6524 Features and Benefits

Features	Benefits
Layer 2 Switching	
IEEE 802.1Q 802.1Q Tunneling Layer 2 Protocol Tunneling (L2PT)	802.1Q and L2PT are the service enablers to offer Layer 2 VPNs. By encapsulating users' data frames in an outer 802.1Q tag and by tunneling users' PDUs, 802.1Q tunneling allows to segregate users' traffic and to scale the number of users beyond the 4096 VLAN boundary
IEEE 802.1D IEEE 802.1w IEEE 802.1s Flexlink Port Aggregation Protocol (PAgP) IEEE 802.3ad Unidirectional Link Detection	Protocols such as IEEE 802.1D, IEEE 802.1w, and IEEE 802.1s help ensure business continuity by minimizing the network convergence time for time-sensitive applications. Flexlink provides fast failover over point-to-point connections, without the overhead of control protocols. PAgP and IEEE 802.3ad increase bandwidth availability and provide fast link failover within the Cisco EtherChannel bundle. Unidirectional Link Detection (UDLD) increases the network reliability by quickly detecting unidirectional links or misplaced fiber connectors.

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Features	Benefits
Cisco Discovery Protocol VLAN Trunk Protocol (VTP)	Cisco Discovery Protocol and VTP ease the network and service configuration by detecting peer capability and by propagating the VLANs information within the network.

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Features	Benefits
Layer 3 Routing	
Open Shortest Path First (OSPF) Enhanced Interior Gateway Routing Protocol (EIGRP) Intermediate System-to-Intermediate System (IS-IS) Protocol Border Gateway Protocol Version 4 (BGPv4) Hot Standby Router Protocol (HSRP) Virtual Router Redundancy Protocol (VRRP) Gateway Load Balancing Protocol (GLBP) Bidirectional Forwarding Detection (BFD) for OSPF and IS-IS Static Routing	High-performance IP routing protocols form the foundation for scalable Layer 3 services.
Efficient Multicast Distribution	
Protocol Independent Multicast (PIM, PIM-SM, PIM-SSM) PIM Snooping Bidirectional PIM Internet Group Management Protocol version 1, 2, 3 (IGMP v1, v2, v3) IGMP Snooping	Enable efficient and scalable delivery of video applications.
Advanced Quality of Service	
Ingress Policing—Per Port, Per VLAN, Per Port + Per VLAN Per-port egress policing DSCP Transparency Class of service (CoS) Mutation	Flexible Policing functions classify and rate-limit the users' traffic based on port, VLAN, and port + VLAN information. Layer 3 per-port egress policing allows the delivery of multipoint services with tight service-level agreement (SLA) requirements. User traffic can be marked at Layer 2 or Layer 3, to fulfill differentiated QoS models.
Priority Queue Shaped Round Robin (SRR) Deficit Weighted Round Robin (DWRR) Weighted Random Early Detection (WRED)	Intelligent queuing mechanism helps ensure that the highest-priority data is serviced ahead of other traffic. Congestion avoidance and scheduling algorithms help regulate traffic and prevent network congestion. SRR enhances the scheduling algorithm by shaping the traffic that egress each queue.
Robust Security Solution	
Private VLAN IEEE 802.1x Dynamic Host Configuration Protocol (DHCP) Snooping DHCP Option 82 Dynamic ARP Inspection	Private VLAN enforces users' security by isolating the traffic flows coming from different users. IEEE 802.1x, port-based security and port-based access lists allow to grant access to network resources and privileges through identity-based networking. DHCP Snooping, DHCP Option 82, and Dynamic ARP Inspection help in identifying user's MAC and IP address and port number, hence preventing attacks from malicious users.
VLAN-based and port-based ACLs Port Security on Access, 802.1Q trunk, and 802.1Q tunneling ports Per-VLAN MAC Limiting Control Plane Policing Hardware-based Rate Limiters Storm Control Unicast Flood Blocking	Malicious attacks can jeopardize the functionality of the network by compromising the switch CPU, MAC table, etc. Features such as Port Security and Per-VLAN MAC Limiting restrict the number of MAC addresses that can be learned on the network. Hardware-enabled ACLs and rate limiters restrict undesired traffic in the network, while storm control features rate-limit the amount of broadcast and multicast frames injected into the switch.
MPLS	
Ethernet over MPLS (EoMPLS) EoMPLS VC Type 4 and VC Type 5 MPLS VPN (RFC2547) MPLS Traffic Engineering (MPLS TE) MPLS Fast Reroute (MPLS FRR)	Enhance the service flexibility by allowing Layer 2 and Layer 3 services integration on the same platform. MPLS TE and FRR features allow to transport services with different levels of protection and service guarantees.

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Features	Benefits
IPv6	
Native IPv6 RIPng, MP-BGP4, OSPFv3 IPv6 over IPv4 Tunnels Internet Control Message Protocol version 6 (ICMPv6) Configured, Automatic, GRE, 6to4, ISATAP Tunnels IPv6 QoS PIM-SM and PIM-SSM	Improve the scalability of IP deployments, allowing high-performing network evolution. Multicast protocols and QoS features optimize video delivery over an end-to-end IP architecture.

Table 2. Cisco ME 6524 Scalability Numbers

Description	Specification
MAC Addresses	Up to 96,000
IPv4 Routes	Up to 256,000
IPv6 Routes	Up to 128,000
EoMPLS Tunnels	4096
MPLS VPNs	512
NetFlow Entries	Up to 128,000

Product Architecture

Table 3 lists details about the Cisco ME 6524 product architecture. Table 4 and Table 5 list product specifications and standards and management information. Table 6 provides safety and compliance information.

Table 3. Cisco ME 6524 Product Architecture

Description	Specification
Hardware-Based Forwarding Engine	Policy Feature Card 3C (PFC3C) onboard
MSFC Daughter Card Version	MSFC2A onboard
Performance	Up to 15 mpps
Switching Capacity	32 Gbps
Uplinks	8 Gigabit Ethernet SFP interfaces
Downlinks	• 24 Gigabit Ethernet SFP interfaces or • 24 Ethernet 10/100/1000 interfaces
MTU	9216 bytes—Jumbo frames supported on uplink and downlink interfaces
Uplink Oversubscription	Not over-subscribed
Downlink Oversubscription	3:1 in case of 1 GE port speed
Uplink Queue Structure	• TX: 1p3q8t • RX: 2q8t • Deep Buffer: 12.8 MB per port (50% TX and 50% RX)
Uplink Port Scheduler	Strict Priority Scheduling with either Shaped Round Robin (SRR) or Deficit Weighted Round Robin (DWRR)
Downlink Queue Structure	• TX: 1p3q8t • RX: 1q2t • Deep Buffer TX: 21.33 MB per port • Deep Buffer RX: 240 KB shared by three ports
Downlink Port Scheduler	DWRR, Weighted Random Early Detection (WRED)
USB Port	Two USB ports (host and device)

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Product Specifications

Table 4. Product Specifications

Description	Specification
Software compatibility	Cisco IOS® Software Release 12.2(18)ZU
Protocols	Layer 2 switching protocols Layer 3 routing protocols Multicast protocols Comprehensive MPLS support IPv6
USB Port	Two USB ports (host and device)
Connectors and Cabling	Management console port: RS232 (RJ-45) Support for transceivers is constantly enhanced as new optics/pluggables become available. Please refer to the transceiver support section in the release notes under: www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.html
Memory	256 MB of default DRAM for the switch processor, upgradeable to 512 MB or 1 GB. Software modularity images require a minimum of 512 MB DRAM on the switch processor. 512 MB of default DRAM for the router processor, upgradeable to 1 GB 128-MB boot flash for the switch processor 64-MB boot flash for the route processor
Options	Removable storage: 512 MB and 1 GB(compact flash)
Reliability and Availability	Dual field-replaceable and hot-swappable redundant DC or AC power supplies Field-replaceable and hot-swappable fan unit Mean Time Between Failure (MTBF): • 58481 hours for ME-C6524GS-8S • 59172 hours for ME-C6524GT-8S Mean Time Between Critical Failure (MTBCF): • 69155 hours for ME-C6524GS-8S • 70983 hours for ME-C6524GT-8S
Physical Dimensions (H x W x D)	1.5 RU 2.625 x 17.45 x 19 in. (6.7 x 44.3 x 48.3 cm)
Weight	29.13 lb (13.21 Kg)
Power	Power consumption: 400W Power supply module can be redundant or non-redundant. AC and DC power modules are available. AC input voltage: • Between 100 and 240VAC (nominal) • Use the supplied AC power cord to connect the AC power connector to an AC power outlet. The cords ships with the AC power module. AC input current: • 5.0A max @ 110VAC • 2.5A max @ 220VAC AC input-frequency range: • 47-63 Hz DC input voltage: • Domestic, –40.5 VDC to –56 VDC continuous • International, –55 VDC to –72 VDC continuous DC input current: • 11A @ –48 VDC • 9A @ –60 VDC

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Standards and Management

Table 5. Cisco ME 6524 Standards and Management

Description	Specification	
Standards and Protocols	• IEEE 802.3 • IEEE 802.3u • IEEE 802.3z • IEEE 802.3x • IEEE 802.3ab • IEEE 802.1t • IEEE 802.1u • IEEE 802.1Q • IEEE 802.1p • IEEE 802.1D • IEEE 802.1w • IEEE 802.1s • IEEE 802.1x • IEEE 802.3ad • IEEE 802.3x • RIPv2 • EIGRP • OSPF • IS-IS	• BGPv4 • Policy Based Routing (PBR) • HSRP (RFC2281) • Virtual Router Redundancy Protocol (VRRP) • Bidirectional Forwarding Detection (BFD) for OSPF and IS-IS • Internet Group Management Protocol (IGMP) v1, v2, v3 • IGMP Proxy reporting for IGMPv2 and MLDv1 • PIM • PIM-SM, PIM-SSM, Bidirectional PIM • WCCPv2 • MPLS VPN (RFC2547) • Ethernet over MPLS (EoMPLS Martini draft) • Generic Routing Encapsulation (GRE)
Management	• Simple Network Management Protocol Version 1, 2, and 3 (SNMPv1, v2, v3) • Telnet Interface • VTP • CDP • IGMP Snooping • DHCP Snooping • Remote Switch Port Analyzer (RSPAN), Encapsulated Remote SPAN (ERSPAN) • Embedded Remote Monitoring (RMON) software agent • Domain Name System (DNS) • Trivial File Transfer Protocol (TFTP) • Network Timing Protocol (NTP) • Multifunctional LEDs per port, and multifunction LEDs for power supplies	

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Description	Specification	
MIBs	• BRIDGE-MIB (RFC1493) • BGP4-MIB (RFC1657) • CISCO-ACCESS-ENVMON-MIB • CISCO-BGP-POLICY-ACCOUNTING-MIB • CISCO-BGP4-MIB • CISCO-CDP-MIB • CISCO-CLASS-BASED-QOS-MIB • CISCO-CONFIG-COPY-MIB • CISCO-CONFIG-MAN-MIB • CISCO-ENTITY-ALARM-MIB • CISCO-ENTITY-EXT-MIB • CISCO-ENTITY-VENDORTYPE-OID-MIB • CISCO-FLEX-LINKS-MIB • CISCO-FTP-CLIENT-MIB • CISCO-HSRP-EXT-MIB • CISCO-HSRP-MIB • CISCO-IETF-IP-FORWARD-MIB • CISCO-IETF-IP-MIB • CISCO-IF-EXTENSION-MIB • CISCO-IMAGE-MIB • CISCO-IP-STAT-MIB • CISCO-IPMROUTE-MIB • CISCO-L2-CONTROL-MIB • CISCO-L2-TUNNEL-CONFIG-MIB • CISCO-MAC-NOTIFICATION-MIB • CISCO-MEMORY-POOL-MIB • CISCO-NDE-MIB • CISCO-OSPF-MIB • CISCO-OSPF-TRAP-MIB • CISCO-PAE-MIB • CISCO-PAGP-MIB • CISCO-PIM-MIB • CISCO-PING-MIB • CISCO-PRIVATE-VLAN-MIB • CISCO-PROCESS-MIB • CISCO-PRODUCTS-MIB • CISCO-QUEUE-MIB • CISCO-RMON-CONFIG-MIB • CISCO-RTTMON-MIB • CISCO-STP-EXTENSIONS-MIB • CISCO-SVI-AUTOSTATE-MIB • CISCO-SWITCH-ENGINE-MIB	• CISCO-SYSLOG-MIB • CISCO-TCP-MIB • CISCO-UDLDP-MIB • CISCO-VLAN-IFTABLE-RELATIONSHIP-MIB • CISCO-VTP-MIB • ENTITY-MIB • ENTITY-SENSOR-MIB • EVENT-MIB • IF-MIB • IGMP-MIB • IPMROUTE-MIB • MPLS-LDP-MIB • MPLS-LSR-MIB • MPLS-TE-MIB • MPLS-VPN-MIB • NOTIFICATION-LOG-MIB • OLD-CISCO-CHASSIS-MIB • OLD-CISCO-CPU-MIB • OLD-CISCO-INTERFACES-MIB • OLD-CISCO-IP-MIB • OLD-CISCO-MEMORY-MIB • OLD-CISCO-TCP-MIB • OSPF-MIB • OSPF-TRAP-MIB • PIM-MIB • RFC1213-MIB • RMON-MIB • RMON2-Mib • RSVP-MIB • SMON-MIB • SNMP-FRAMEWORK-MIB • SNMP-NOTIFICATION-MIB • SNMP-PROXY-MIB • SNMP-TARGET-MIB • SNMP-USM-MIB • SNMP-VACM-MIB • SNMPv2-MIB • SOURCE-ROUTING-MIB • TCP-MIB • UDP-MIB
Metro Ethernet Forum	MEF9 and MEF14 certified	

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Safety and Compliance

Table 6. Safety and Compliance

Description	Specification
Electromagnetic Emission Compliance (EMC)	• CE marking • FCC Part 15 • VCCI Class A • EN55022 Class A • CISPR 22 Class A • AS/NZS CISPR22 Class A • ETS300 386 • EN55024 • EN61000-3-2 • EN61000-3-3
Safety	• UL 60950 • CSA-C22.2 No. 60950 • EN 60950 • IEC 60950
NEBS	• GR-63-CORE NEBS Level 3 • GR-1089-CORE NEBS Level 3
ETSI	• ETS 300 019 Storage Class 1.1 • ETS 300 019 Transportation Class 2.3 • ETS 300 019 Stationary Use Class 3.1
Noise Specifications	• Central Office (CO) Specification: 60 dBA
Operating Environment	• Temperature: 32°F (0°C) to 104°F (+40°C) • Altitude: Up to 10,000 ft (3000m) • Relative humidity: 10% to 85% (noncondensing)
Storage Environment	• Temperature: –4°F (–20°C) to 149°F (+65°C) • Altitude: 15,000 ft (4570m) • Relative humidity: 5% to 95% (noncondensing)

Ordering Information

Table 7 lists the ordering information for Cisco ME 6524.

To place an order, visit the Cisco Ordering Home Page.

Table 7. Ordering Information

Part Number	Description
ME-C6524GS-8S	24 Gigabit Ethernet SFP interfaces + 8 Gigabit Ethernet SFP uplinks, 1 Fan Tray
ME-C6524GT-8S	24 Ethernet 10/100/1000 interfaces + 8 Gigabit Ethernet SFP uplinks, 1 Fan Tray
PWR-400W-DC	400W DC Power Supply for the Cisco ME 6524
PWR-400W-AC	400W AC Power Supply for the Cisco ME 6524
MEM-XCEF720-256M	Default Memory on the Cisco ME 6524 Switch Processor
MEM-XCEF720-512M	512-MB Memory Upgrade Option for the Switch Processor on the Cisco ME 6524
MEM-XCEF720-1GB	1-GB Memory Upgrade Option for the Switch Processor on the Cisco ME 6524
MEM-MSFC2-512MB	Default Memory on the Cisco ME 6524 Router Processor
MEM-MSFC3-1GB	1-GB Memory Upgrade Option for the Router Processor on the Cisco ME 6524
MEM-C6K-CPTFL512M	Optional External Compact Flash memory 512 MB
S523IBL-12218ZU	Cisco ME 6524 IOS IP BASE LAN only
S523IBK9L-12218ZU	Cisco ME 6524 IOS IP BASE SSH LAN only
S523AIK9L-12218ZU	Cisco IOS Advanced IP Services

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Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools, and partners, resulting in high levels of customer satisfaction. Cisco services help you to protect your network investment, optimize network operations, and prepare the network for new applications to extend network intelligence and the power of your business. For more information about Cisco services, see Cisco Technical Support Services or Cisco Advanced Services.

For More Information

For more information about the Cisco ME 6524, visit www.cisco.com/en/US/products/ps6845/index.html or contact your local account representative.

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