Cisco Catalyst 6500 Series Supervisor Engine 2T

Product Overview

The Cisco® Catalyst® 6500 Supervisor Engine 2T (Figure 1) is the newest addition to the family of supervisor engines. The Supervisor Engine 2T is designed to deliver higher performance, better scalability, and enhanced hardware-enabled features. Supervisor Engine 2T integrates a high-performance 2-Terabit crossbar switch fabric that enables 80 Gbps switching capacity per slot on all Cisco Catalyst 6500 E-Series Chassis. The forwarding engine on Supervisor Engine 2T is capable of delivering high-performance forwarding for Layer 2 and Layer 3 services. Supervisor Engine 2T delivers many new hardware-enabled innovations in the areas of security, quality of service (QoS), virtualization, and manageability. The rich feature set of Supervisor Engine 2T enhances applications such as traditional IP forwarding, Layer 2 and Layer 3 Multiprotocol Label Switching (MPLS) VPNs, and VPLS. The Cisco Catalyst 6500 with Supervisor Engine 2T and all the features and the technical advancements establish product leadership in borderless networks as well as data center deployments.

Figure 1. Supervisor Engine 2T

Features and Benefits

Supervisor Engine 2T delivers scalable performance, intelligence, and a broad set of features to address the needs of Borderless Networks, data centers, and service provider networks. Some of the primary features for Supervisor Engine 2T include:

- **Platform scalability:** Delivering up to 80 Gbps per slot of switching capacity on E-Series chassis; 2-Terabit aggregate bandwidth capacity using the 6513-E chassis, scaling to 4-Terabit capacity with VSS. Support for up to 1056 ports of 1Gbps and 352 ports of 10Gbps systems deployed with VSS. Providing 1Gbps/10Gbps and 40Gbps interface support to address future customer bandwidth growth requirements.
- **Security:** Support for Cisco TrustSec, CTS, providing MacSec encryption and Role-Based ACL. Providing control plane policing to address denial of service attacks.
- **Virtualization:** Native support for VPLS, as well as enhancements such as VPN-aware NAT, VPN statistics, and VPN netflow as important features needed for deployment of network virtualization.
- **Netflow application monitoring:** Supervisor Engine 2T supports enhanced application monitoring such as Flexible and Sampled Netflow for intelligent and scalable application monitoring.

Primary Supervisor Engine 2T Components

Policy Feature Card 4

Supervisor Engine 2T features the integrated Policy Feature Card 4 (PFC4), which improves performance and scalability and provides new and enhanced hardware features. The PFC4 is equipped with a high-performance ASIC complex that enables hardware acceleration for existing and new software features. The PFC4 supports Layer 2 and Layer 3 forwarding, QoS, Netflow and Access Control List (ACLs) and multicast packet replication and processes security policies such as access control lists (ACLs) operations all simultaneously enabled with no performance impact. The PFC4 supports all of these operations for both IPv4 and IPv6.

PFC4 also provides enhanced performance and scalability and supports many new innovations such as native VPLS, flexible NetFlow, egress NetFlow, Cisco TrustSec, distributed policers, control plane policing, and comprehensive IPv6 features.

Multilayer Switch Feature Card 5

Supervisor Engine 2T features the Multilayer Switch Feature Card 5 (MSFC5), providing high-performance, multilayer switching and routing intelligence. Equipped with a high-performance processor, the MSFC5 runs both Layer 2 protocols and Layer 3 protocols on the dual-core CPU complex. These include routing protocol support, Layer 2 protocols (for example, Spanning Tree Protocol and VLAN Trunking Protocol), and security services.

The MSFC5 builds the Cisco Express Forwarding information base (FIB) table in software and then downloads this table to the hardware application-specific-integrated circuits (ASICs) on the PFC4 and Distributed Forwarding Card 4 (DFC4), if present on a module, which make the forwarding decisions for IP unicast and multicast traffic.

Features and Benefits details

This section provides details of scalability and performance capabilities of Supervisor Engine 2T and functions supported.

Tables 1 through 4 show the scalability, virtualization and security features for Supervisor Engine 2T.

Table 1.   Scalability

Name	VS-S2T-10G	VS-S2T-10G-XL
IPv4 routing	In hardware Up to 720 Mpps**	In hardware Up to 720 Mpps**
IPv6 routing	In hardware Up to 390 Mpps**	In hardware Up to 390 Mpps**
L2 bridging	In hardware Up to 720 Mpps**	In hardware Up to 720 Mpps**
MPLS	MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling. Up to 8192 VRFs with a total of up to 256K* forwarding entries per system.	MPLS in hardware to enable use of Layer 3 VPNs and EoMPLS tunneling. Up to 8192 VRFs with a total of up to 1024K forwarding entries per system.
VLAN	4K	4K
Bridge domains	16k	16k
VPLS	In hardware (Up to 390 Mpps**)	In hardware (Up to 390 Mpps**)
GRE	In hardware (Up to 390 Mpps**)	In hardware (Up to 390 Mpps**)
NAT	Hardware assisted	Hardware assisted
MAC entries	128k	128k
Routes	256K(IPv4) 128K (IPv6)	1024K (IPv4) 512K (IPv6)

Name	VS-S2T-10G	VS-S2T-10G-XL
Netflow entries	512K	1024K
Multicast routes	128K (IPv4) 128K (IPv6)	128K (IPv4) 128K (IPv6)

* 1K=1024.
** Requires fully populated 6513-E chassis with DFC4/DFC4XL

Table 2.   QoS Features and Scalability

Feature	VS-S2T-10G	VS-S2T-10G-XL
Layer-3 classification and marking access control entries (ACEs)	64K shared for QOS / Security	256K shared for QOS/Security
Aggregate traffic rate-limiting policers	16348	16348
Flow-based rate-limiting method; number of rates	Per source address, destination address, or full flow; 64 rates	Per source address, destination address, or full flow; 64 rates
Layer 2 rate limiters	20 ingress/6 egress	20 ingress/6 egress
MAC ACLs featuring per-port/per VLAN granularity	Yes	Yes
Distributed policers	Yes	Yes
Shared uFlow policers	Yes	Yes
Egress uFlow policers	Yes	Yes
Packet or byte policers	Yes	Yes
Per port per VLAN	Yes	Yes

Table 3.   Security Features and Scalability

Feature	VS-S2T-10G	VS-S2T-10G-XL
Port security	Yes	Yes
IEEE 802.1x and 802.1x extensions	Yes	Yes
VLAN and router ACLs and port ACLs	Yes	Yes
1:1 mask ratio to ACE values	Yes	Yes
Security ACL entries	64K shared for QOS / Security	256K shared for QOS/Security
CPU rate limiters (DoS protection)	57	57
uRPF check (IPv4/IPv6)	Up to 16	Up to 16
Number of interfaces with unique ACL	16k	16k
RPF interfaces	16	16
Private VLANs	Yes	Yes
MAC ACLs on IP	Yes	Yes
Logical interfaces	128k	128k
EtherChannel hash	8 bits	8 bits
Cisco TrustSec support (including L2 encryption)	Yes	Yes
CPU HW rate limiters by PPS or BPS	Yes	Yes
CoPP for multicast	L2 and L3 support	L2 and L3 support
CoPP for exceptions (MTU, TTL)	Yes	Yes
CoPP exceptions Netflow support	Yes	Yes
ACL labels	16K	16K
Port ACL	8K	8K
ACL dry run	Yes	Yes
Hitless ACL changes	Yes	Yes

Table 4.   MPLS and Virtualization Features

Feature	VS-S2T-10G	VS-S2T-10G-XL
VSS	Yes	Yes
Label imposition/disposition (MPLS-PE), swapping (MPLS-P)	Yes	Yes
Label Distribution Protocol (LDP)	Yes	Yes
MPLS VPN	Yes	Yes
VRF Lite	Yes	Yes
QoS mechanisms using experimental (EXP) bits	Yes	Yes
MPLS-RSVP-TE	Yes	Yes
MPLS differentiated services (diffserv)-aware traffic engineering (MPLS-DS-TE)	Yes	Yes
MPLS traceroute	Yes	Yes
EoMPLS	Yes	Yes
EoMPLS tunnels	16k	16k
Native VPLS in HW	Yes	Yes
Native L2 over multipoint GRE	Yes	Yes
VRF-aware operational contexts	Yes	Yes
VPN Netflow support	Yes	Yes
VPN aware NAT	Yes	Yes
VRF-lite scalability	VLAN reuse per sub-interface	VLAN reuse per sub-interface
Per VPN interface statistics	Yes	Yes

Platform Support and Compatibility

Table 5 lists product specifications.

Table 5.   Product Specifications

Product	Specifications
Chassis compatibility	● E-Series only: Cisco Catalyst 6503-E, 6504-E, 6506-E, 6509-E, 6509-V-E, 6513E
Switch fabric	● 2.08 Tbps Crossbar Switch Fabric with 26 Fabric Channels
Line-card compatibility	● WS-X6908-10G-2T, WS-X6908-10G-2TXL ● WS-X6824-SFP-2T, WS-X6824-SFP-2TXL ● WS-X6848-SFP-2T, WS-X6848-SFP-2TXL ● WS-X6848-TX-2T, WS-X6848-TX-2TXL ● WS-X6816-10T-2T, WS-X6816-10T-2TXL ● WS-X6816-10G-2T, WS-X6816-10G-2TXL ● WS-X6904-40G-2T, WS-X6904-40G-2TXL ● WS-X6704-10GE with CFC ● WS-X6724-SFP with CFC ● WS-X6748-SFP with CFC ● WS-X6748-GE-TX with CFC ● WS-X6148A-RJ-45, WS-X6148A-45AF, WS-X6148-FE-SFP, WS-X6148A-GE-TX, WS-X6148A-GE-45AF, WS-X6148E-GE-45AT **With a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-A, WS-F6k-DFC4-AXL)** ● WS-X6704-10GE ● WS-X6724-SFP ● WS-X6748-SFP ● WS-X6748-GE-TX **With a DFC4 or DFC4XL upgrade (WS-F6k-DFC4-E, WS-F6k-DFC4-EXL)** ● WS-X6716-10G-3C, WS-X6716-10G-3CXL ● WS-X6716-10T-3C, WS-X6716-10T-3CXL

Product	Specifications
Fan tray and power supply supported	1400W for 6503-E 2700W for 6504-E 3000W AC or DC all other chassis 4000W AC or DC all other chassis 6000W AC or DC all other chassis 8700W AC all other chassis
Slot requirements	Occupies the Supervisor slots as follows: 3-slot E-chassis: slots 1 and 2 4-slot E-chassis: slots 1 and 2 6-slot E-chassis: slots 5 and 6 9-slot V-E chassis: slots 5 and 6 9-slot E-chassis: slots 5 and 6 13-slot E-chassis: slots 7 and 8
Software compatibility	12.2(50)SY and future releases
Optics and SFP options	- X2-10GB-LR, - X2-10GB-SR - X2-10GB-CX4, - X2-10GB-ER, - X2-10GB-LX4, - X2-10GB-LRM - X2-10GB-ZR - X2-10GB-DWDM - CVR-X2-SFP10G - OneX Adapter - SFP-H10GB-CU1M1 - 1 Meter Passive Cable - SFP-H10GB-CU3M1 -3 Meter Passive Cable - SFP-H10GB-CU5M1 - 5 Meter Passive Cable - SFP-10G-SR
Service Modules	ACE 20, ACE 30, NAM-1, NAM-2, NAM-3, FWSM, ASA-SM, WiSM-1, WiSM-2
SW packages	- IP BASE - IP Services - Advanced IP Services - Advanced Enterprise Services
Connectivity management processor (CMP)	Integrated Connectivity Management Processor for improved Out-of-Band Management
DRAM	2GB for Lite and XL (4GB upgrade with 2GB memory upgrade (2+2)
NVRAM	4 MB
Compact Flash	1GB
USB	USB base console and file system - Support for Host and Device
Management LED	Blue Beacon LED
Uplink ports	3 x GE SFP Ports 2 x 10G X2 Ports 1 x 10/100/1000 Management Port
Console ports	One console port (RJ-45)
Reliability and availability	- FSU (Fast software upgrade) - SSO+NSF (Stateful Switchover + Nonstop Forwarding) - OIR (Online insertion and removal) Hot Swap of power supplies, modules, fan trays and Supervisors
MIBs	- MPLS LDP MIB, MPLS Label Switch Router (LSR) MIB, MPLS-TE MIB, MPLS VPN MIB; see software release notes for additional information - Check the following MIB finder for more info: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml
Network management	Cisco Works
Physical specifications	(H x W x D): 1.73 x 14.4 x 16 in (4.4 x 36.6 x 40.6 cm) - Weight: 12.0 lbs

Product	Specifications
Power consumption	• Lite: 435W MAX • XL: 450W MAX
ECC	• ECC Protection Support
Environmental conditions	• Operating temperature: 32 to 104℉ (0 to 40℃) • Storage temperature: -40 to 167℉ (-40 to 75℃) • Relative humidity: 10 to 90 percent, noncondensing

**Check software release for availability.

Product Specifications

Table 6 lists specifications and compliance information.

Table 6.   Product Specifications and Compliance

Product	Specifications
Regulatory Compliance	
Safety	• UL 60950-1 • CAN/CSA-C22.2 No. 60950-1 • EN 60950-1 • IEC 60950-1 • AS/NZS 60950-1 • GB4943
EMC: emissions	• 47CFR Part 15 (CFR 47) Class A • AS/NZS CISPR22 Class A • CISPR2 2 Class A • EN55022 Class A • ICES003 Class A • VCCI Class A • EN61000-3-2 • EN61000-3-3 • KN22 Class A • CNS13438 Class A
EMC: immunity	• EN50082-1 • EN61000-6-1 • EN55024 • CISPR24 • EN300386 • KN 61000-4 Series
NEBS criteria levels	• SR-3580 NEBS level 3 GR-63-CORE, issue 3; GR-1089 CORE, issue 4
Verizon NEBS compliance	• Telecommunications Carrier Group (TCG) Checklist
Qwest NEBS requirements	• Telecommunications Carrier Group (TCG) Checklist
ATT NEBS requirements	• ATT TP76200 level 3 and TCG Checklist
ETSI	• ETS 300 019-2-1, Class 1.2 Storage • ETS 300 019-2-2, Class 2.3 Transportation • ETS 300 019-2-3, Class 3.2 Stationary Use

Ordering Information

To place an order, visit the Cisco Ordering Home Page. Tables 7 and 8 give ordering and part number information.

Table 7.   Supervisor Engine and Memory Part Number

Part Number	Description
VS-S2T-10G	Cisco Catalyst 6500 Series Supervisor Engine 2T
VS-S2T-10G-XL	Cisco Catalyst 6500 Series Supervisor Engine 2T XL
VS-S2T-10G=	Cisco Catalyst 6500 Series Supervisor Engine 2T Spare
VS-S2T-10G-XL=	Cisco Catalyst 6500 Series Supervisor Engine 2T XL Spare
VS-F6K-PFC4XL=	Cisco Catalyst 6500 Series Supervisor PFC 4 XL Spare
MEM-SUP2T-2GB	Cisco Catalyst 6500 2GB Memory for Supervisor Engine 2T
MEM-SUP2T-2GB=	Cisco Catalyst 6500 2GB Memory for Supervisor Engine 2T Spare
MEM-C6K-CPTFL1GB	Cisco Catalyst 6500 Compact Flash Memory 1GB
MEM-C6k-CPTFL1GB=	Cisco Catalyst 6500 Compact Flash Memory 1GB Spare
MEM-C6K-CPTFL2GB	Cisco Catalyst 6500 Compact Flash Memory 2GB
MEM-C6k-CPTFL2GB=	Cisco Catalyst 6500 Compact Flash Memory 2GB Spare

Table 8.   Software Part Numbers

Software Part Number	Description
S2TAEK9-12250SY	Cisco CAT6000-VS-S2T IOS ADV ENT SERV FULL ENCRYPT
S2TAEK9N-12250SY	Cisco CAT6000-VS-S2T IOS ADVANCED ENTERPRISE SERVICES NPE
S2TAIK9-12250SY	Cisco CAT6000-VS-S2T IOS ADVANCED IP SERVICES FULL ENCRYPT
S2TAIK9N-12250S	Cisco CAT6000-VS-S2T IOS ADVANCED IP SERVICES LAN ONLY NPE
S2TIBK9-12250SY	Cisco CAT6000-VS-S2T IOS IP BASE LAN ONLY FULL ENCRYPT
S2TIBK9N-12250SY	Cisco CAT6000-VS-S2T IOS IP BASE LAN ONLY NPE
S2TISK9-12250SY	Cisco CAT6000-VS-S2T IOS IP SERV LAN ONLY FULL ENCRYPT
S2TISK9N-12250SY	Cisco CAT6000-VS-S2T IOS IP SERV LAN ONLY NPE
S2TIB-12250SY	Cisco CAT6000-VS-S2T IOS IP BASE
S2TIS-12250SY	Cisco CAT6000-VS-S2T IOS IP SERV

Cisco and Partner Services

Enable the innovative, secure, intelligent edge in the Borderless Network Architecture using personalized services from Cisco and our partners. Through a discovery process that begins with understanding your business objectives, we help you integrate the new Cisco Catalyst 6500-C4 System into your architecture and incorporate network services onto that platform. Sharing knowledge and leading practices, we support your success every step of the way as you deploy, absorb, manage, and scale new technology. Choose from a flexible suite of support services designed to meet your business needs and help you maintain high-quality network performance while controlling operational costs. For additional information about Cisco services, visit http://www.cisco.com/go/services.

Warranty Coverage and Technical Service Options

The Cisco Catalyst 6500 C4 System comes with a Cisco 90-day hardware warranty. Adding a contract for a technical service offering such as Cisco SMARTnet® Service to your device coverage provides access to the Cisco Technical Assistance Center (TAC) and can provide a variety of hardware replacement options to meet critical business needs, updates for licensed OS software, and registered access to the extensive Cisco.com knowledge base and support tools.

For more information about Cisco warranties, go to http://www.cisco.com/go/warranty.

For information about Cisco Technical Services, go to http://www.cisco.com/go/ts.

Table 9 shows the Cisco technical services available for the Cisco Catalyst 6500 C4 System.

Table 9. Cisco Technical Services for Cisco Catalyst 6500 C4 System

Technical Services
Cisco SMARTnet Service • Around-the-clock, global access to the Cisco Technical Assistance Center (TAC) • Unrestricted access to the extensive Cisco.com resources, communities, and tools • Next-business-day, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement[2] and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set[1] • Proactive diagnostics and real-time alerts on Smart Call Home enabled devices
Cisco Focused Technical Support Services Three levels of premium, high-touch services are available: • Cisco High-Touch Operations Management Service • Cisco High-Touch Technical Support Service • Cisco High-Touch Engineering Service Valid Cisco SMARTnet or SP Base contracts on all network equipment are required.

Footnotes:

1. Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the licensed feature set.
2. Advance hardware replacement is available in various service-level combinations. For example, 8x5xNBD indicates that shipment will be initiated during the standard 8-hour business day, 5 days a week (the generally accepted business days within the relevant region), with next business day (NBD) delivery. Where NBD is not available, same day ship is provided. Restrictions apply; please review the appropriate service descriptions for details.

For More Information

For more information about Cisco Catalyst 6500 Series switch, visit
http://www.cisco.com/en/US/products/hw/switches/ps708/index.html.

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