Cisco Catalyst 6880-X Series Extensible Fixed Aggregation Switch

Product Overview

Network traffic has grown exponentially over the last several years, and this trend is expected to continue into the foreseeable future. By 2016, there will be 19 billion networked devices, up from 10 billion in 2011. Business IP traffic is expected to reach 13.1 exabytes per month in 2016[1]. Networks must be capable of scaling well beyond the needs of today to deal with the traffic of tomorrow while at the same time providing investment protection.

The Cisco® Catalyst® 6880-X Series Switch (Figure 1) is an extensible fixed aggregation switch that delivers a best-in-class Cisco Catalyst 6500 feature set in a small form factor. This premier aggregation platform offers best-in-class scalability and flexibility with the premier Cisco Catalyst 6500 feature sets. This 40G/100G-ready platform is ideal for those who want to introduce premium 10G services in small or midsize campus backbones. This unique platform offers 10G port density, full MPLS/VPLS functionality with large table sizes (up to 2M FIB entries), and more than 15 years of best-in-class features. With a full suite of L2/L3, virtualization, security, multicast, IPV6, application visibility, smart operations, and rich media services Cisco Catalyst 6800-X delivers unprecedented capabilities on day one. This platform also runs on the same architecture as the Cisco Catalyst 6500 Supervisor Engine 2T and therefore offers stability with a proven operating system software.

The Cisco Catalyst 6800-X Series chassis offers integrated resiliency by providing N+1 redundant fans, 1+1 power supply redundancy, and support for virtual switching system (VSS), thereby limiting network downtime, and ensures workforce productivity, customer satisfaction, and profitability.

Cisco Catalyst 6880-X Product Details

The Cisco Catalyst 6880-X provides flexibility to build desired port density through two versions (C6880-X-LE with standard FIB/ACL/Netflow tables and C6880-X with larger FIB/ACL/Netflow tables) of base chassis along with optional port cards (Figure 2). The base chassis comes with 16 10G/1G ports, and each port card supports 16 additional 10G/1G ports. Each system can be built up to 80 ports in 16-port increments. The port interface on the base module and the port cards supports both 10 Gigabit Ethernet and 1 Gigabit Ethernet speeds allowing customers to use their investment in 1 Gigabit Ethernet SFP and upgrade to 10 Gigabit Ethernet SFP+ when business demands change, without having to do a comprehensive upgrade of the existing deployment. The port cards are hot swappable.

[1] Cisco VNI forecast - http://www.cisco.com/web/solutions/sp/vni/vni_forecast_highlights/index.html.

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Figure 1. Cisco Catalyst 6880-X Series Chassis with 4 Port Cards

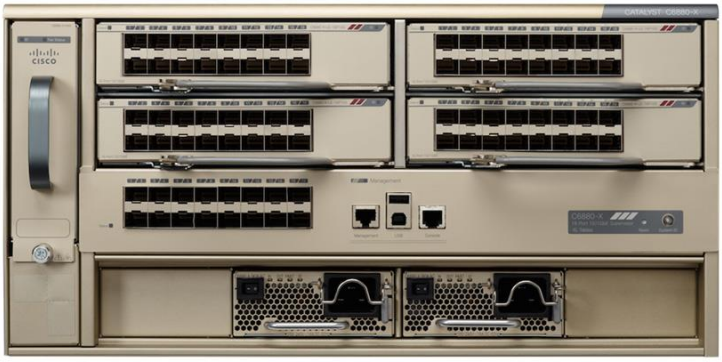

Figure 2. 16-Port Extensible Port Card

The Cisco Catalyst 6880-X Series offers primary features and benefits, including:

- **Platform Scalability:** The platform supports up to 220Gbps slot capacity per port-card. It supports up to 2Tbps of switching capacity, which doubles up to 4Tbps with VSS technology.
- **Security:** Support for Cisco TrustSec (CTS), to provide IEEE 802.1AE MACsec encryption and role-based ACL, CoPP to prevent DoS attacks and Cisco ISE to safeguard and manage end-to-end security for the enterprise.
- **Virtualization:** Comprehensive suite of Virtualization features including L2/L3 VPN, full MPLS, EVN, VRF aware applications for NAT Netflow, GRE for v4/v6, L2 extensions with VPLS etc. to segment different user groups and serve unique security/QoS policy requirements of each of these diverse user groups.
- **Application Visibility and Control (AVC):** Supports enhanced application monitoring such as Flexible and Sampled NetFlow for intelligent and scalable application monitoring.
- **Smart Operations:** The Cisco Catalyst 6880-X supports Catalyst Instant Access*, which allows an Instant Access Client to act as a remote line card of the Cisco Catalyst 6880-X, as well as Smart Install Director, which provides zero-touch deployment of access switches.
- **High Availability:** Two Cisco Catalyst 6880-X Series Switches can be combined into a VSS. In addition to high-availability VSS, provides ease of operation by providing a single point of management, eliminating the need for First Hop Routing Protocol (FHRP) and removing the reliance on Spanning Tree Protocol (STP) for link failure restoration.

* Support of Catalyst Instant Access is available on 15.1(2)SY2 and later releases.

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Product Specifications

System Specifications

Table 1 lists the system specifications for the Cisco Catalyst 6880-X Series Switch.

Table 1. Cisco Catalyst 6880-X Series System Specifications

Item	Specification
Number of port card slots	4
Switching Capacity	Up to 2Tbps
Performance	The chassis is capable of supporting up to 220 Gbps per port card slot. The 16 port 10G port cards and the base module will support 80 Gbps.
Maximum Port Density Per Chassis	Up to 80 x 10 Gigabit Ethernet ports Up to 80x 1 Gigabit Ethernet ports Up to 20x 40 Gigabit Ethernet ports
Maximum Port Density (VSS)	Up to 158x 10 Gigabit Ethernet ports Up to 158x 1 Gigabit Ethernet ports Up to 38x 40 Gigabit Ethernet ports
Power Supply Compatibility	AC: 3000W, DC: 3000W
Module Compatibility	All modules based on the software release in the system
Reliability and Availability	
Online Insertion and Removal (OIR)	OIR supported for redundant power supplies and port cards.
Physical dimensions (H x W x D)	
Inches	8.75x 17.35 x 23
Centimeters	22.23 X 44.07 X 58.42
Rack units (RU)	4.85
Weight	
Chassis with 2 power supplies and fan tray	64 lbs/29.03 kgs
Chassis with 2 power supplies, fan tray with four port cards	88 lbs/39.92 kgs
Input Voltage	100 to 240 VAC -48 to -60 VDC
Safety	UL 60950 Second Edition CAN/CSA-C22.2 No. 60950 Second Edition EN 60950 Second Edition IEC 60950 Second Edition AS/NZS 60950
EMC	FCC Part 15 (CFR 47) Class A VCCI Class A EN55022 Class A CISPR 22 Class A CE marking AS/NZS 3548 Class A ETS300 386 EN55024 EN61000-6-1 EN50082-1
NEBS/ETSI	GR-1089-Core NEBS Level 3 ETS 300 019 Storage Class 1.1 ETS 300 019 Transportation Class 2.3 ETS 300 019 Stationary Use Class 3.1

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Item	Specification
ATIS Pb free and Energy efficiency	ATIS-0600020.2010 Pb Free circuit packs ATIS-0600015-2009 General Energy Efficiency Requirements (TEER) ATIS-0600015.03-2009 Switch and Router Energy Efficiency ATIS-0600015.01-2009 Server Energy Efficiency VZ.TPR.9205 Verizon Energy Efficiency Requirements for Telecommunication Equipment (TEEER)
Network Management	ETHERLIKE-MIB (RFC 1643) IP-MIB and IP-FORWARD-MIB for IPv6 IF-MIB (RFC 1573) Bridge MIB (RFC 1493) CISCO-STACK-MIB CISCO-VTP-MIB CISCO-CDP-MIB RMON MIB (RFC 1757) CISCO-PAGP-MIB CISCO-STP-EXTENSIONS-MIB CISCO-VLAN-BRIDGE-MIB CISCO-VLAN-MEMBERSHIP-MIB ENTITY-MIB (RFC 2037) HC-RMON RFC1213-MIB (MIB-II) SMON-MIB
Operating Environment	
Operating Temperature	32°F to 104°F (0 to 40°C)
Storage Temperature	-4 to 149°F (-20 to 65°C)
Thermal Transition	0.5°C per minute (hot to cold) 0.33°C per minute (cold to hot)
Relative Humidity	Ambient (noncondensing) operating: 5% to 90% Ambient (noncondensing) nonoperating and storage: 5% to 95%
Operating Altitude	Certified for operation: 0 to 6500 ft (0 to 2000 m) Designed and tested for operation: -200 to 10,000 ft (-60 to 3000 m)

Table 2 provides base system scalability information.

Table 2. Base System Scalability

Attribute	C6880-X-LE	C6880-X
MAC entries	128K	128K
Routes	256K (IPv4) 128K (IPv6)	2048K (IPv4) 1024K (IPv6)
ACL entries	64K shared for QoS/Security	256K shared for QoS/Security
NetFlow entries	512K (per module slot) Up to 2.5M per system	1024K (per module slot) Up to 5M per system
Multicast routes	128K (IPv4) 128K (IPv6)	128K (IPv4) 128K (IPv6)
IPv4 routing	In hardware Up to 300 Mpps**	In hardware Up to 300 Mpps**
IPv6 routing	In hardware Up to 150 Mpps**	In hardware Up to 150 Mpps**
L2 bridging	In hardware Up to 300 Mpps**	In hardware Up to 300 Mpps**

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Attribute	C6880-X-LE	C6880-X
Jumbo frame support	Up to 9216 bytes (For bridged and routed pkts.)	Up to 9216 bytes (For bridged and routed pkts.)
VLAN	4K	4K
Bridge domains	16K	16K
MPLS	In hardware (up to 8192 VRFs at 300 Mpps**)	In hardware (up to 8192 VRFs at 300 Mpps**)
Logical interfaces	128K	128K
EtherChannel hash	8 bits	8 bits
VPLS	In hardware (up to 150 Mpps**)	In hardware (up to 150 Mpps**)
GRE	In hardware (up to 150 Mpps**)	In hardware (up to 150 Mpps**)
NAT	Hardware assisted	Hardware assisted
Onboard memory	2GB***	4GB
Ingress buffers	1.25MB per 10G port in 2:1 mode 2.5MB per 10G port in 1:1 mode (10MB per Port ASIC)	1.25MB per 10G port in 2:1 mode 2.5MB per 10G port in 1:1 mode (10MB per Port ASIC)
Egress buffers	24MB per 10G port in 2:1 mode 48MB per 10G port in 1:1 mode (192MB per MUX FPGA)	24MB per 10G port in 2:1 mode 48MB per 10G port in 1:1 mode (192MB per MUX FPGA)
Oversubsription	16P 10G at 2:1 in oversubscription mode (default) for base module and port cards 8P 10G at 1:1 in performance mode (configurable) for base module and port cards	

* 1K=1024

** Requires fully populated system

*** From March 2016, 6880-X-LE units will ship with 4 GB onboard memory

Table 3 provides port card scalability information.

Table 3. Port Card Scalability

Attribute	C6880-X-LE-16P10G	C6880-X-16P10G
Routes	256K (IPv4) 128K (IPv6)	2048K (IPv4) 1024K (IPv6)
ACL entries	64K shared for QoS/Security	256K shared for QoS/Security
NetFlow entries	512K (per module slot) Up to 2.5M per system	1024K (per module slot) Up to 5M per system
Multicast routes	128K (IPv4) 128K (IPv6)	128K (IPv4) 128K (IPv6)

* 1K=1024

Table 4 provides information about QoS features and scalability.

Table 4. QoS Features and Scalability

Feature	C6880-X-LE	C6880-X
Layer-3 classification and marking access control entries (ACEs)	64K shared for QoS/Security	256K shared for QoS/Security
Aggregate traffic rate-limiting policers	16,348	16,348
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

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Feature	C6880-X-LE	C6880-X
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
COS and DSCP based Queue mapping	Yes	Yes
Deficit Weighted Round Robin Scheduler (DWRR) and Weighted Random Early Detection Scheduler (WRED)	Yes	Yes
Receive and Transmit Queues	Default: 1p7q4t Configurable: 2p6q4t	Default: 1p7q4t Configurable: 2p6q4t

Table 5 provides information about security features and scalability.

Table 5. Security Features and Scalability

Feature	C6880-X-LE	C6880-X
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
Layer 2 and Layer 3 Cisco TrustSec (Security Group Tagging & Security Group Access Control List)	Yes	Yes
IEEE 802.1ae (MACsec) Layer 2 encryption in hardware	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

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Table 6 provides information about MPLS and virtualization features.

Table 6. MPLS and Virtualization Features

Feature	C6880-X-LE	C6880-X
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
EVN	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
IPv4 and IPv6 in IPv6 tunneling	Yes	Yes
IPv6 in IPv4 tunnelling (Intra-Site Automatic Tunnel Addressing Protocol [ISATAP], 6to4, GRE	Yes	Yes
QoS support for uniform, short pipe and pipe mode tunnel	Yes	Yes
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 subinterface	VLAN reuse per subinterface
Per VPN interface statistics	Yes	Yes

Table 7 provides information about Netflow and Multicast Features.

Table 7. Netflow and Multicast Features

Feature	C6880-X-LE	C6880-X
Netflow support in hardware	Yes	Yes
Flexible Netflow	Yes	Yes
Sampled Netflow	Yes	Yes
Ingress/Egress Netflow	Yes	Yes
Ingress and Egress replication in hardware	Yes	Yes
IGMPv3 snooping in hardware	Yes	Yes
IPv6 MLDv2 snooping in hardware	Yes	Yes
PIM registers in hardware	Yes	Yes
Label Switched Multicast (LSM)	Yes	Yes

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Table 8 provides information about supported optics for Cisco Catalyst 6880-X Base System and Port Cards.

Table 8. Pluggable Optics for Cisco Catalyst 6880-X Base System and Port Cards

Category	Optics
10G SFP+ Modules	SFP-10G-SR
	SFP-10G-LRM
	SFP-10G-LR
	SFP-10G-ER
	SFP-10G-ZR*
	DWDM-SFP10G (all 40 wavelengths)
10G SFP+ Twinax Copper Cables	SFP-H10GB-CU1M***
	SFP-H10GB-CU3M***
	SFP-H10GB-CU5M***
	SFP-H10GB-ACU7M
	SFP-H10GB-ACU10M
1G SFP Modules	GLC-SX-MM
	GLC-SX-MMD
	GLC-LH-SM
	GLC-LH-SMD
	GLC-EX-SMD
	GLC-ZX-SM
	GLC-ZX-SMD
	GLC-BX-D
	GLC-BX-U
1000BASE-T SFP Module	GLC-T (Support 10/100/1000Mbps)
100BASE-FX SFP Module	GLC-GE-100FX**

* The base system or individual port card supports up to 8 SFP-10G-ZR modules in a 2x8 SFP cage. To meet the thermal requirement the SFP-10G-ZR modules should be deployed on port 1 to 4, or port 13 to 16 (the outer two columns) on the base system or individual port card. A fully populated Catalyst 6880-X system can support 40 SFP-10G-ZR modules.

** Support of GLC-GE-100FX is available on 15.1(2)SY2 and later releases.

*** Only version -02 or later is supported.

Table 9 provides information about software packaging.

Table 9. Software Packaging

Item	C6880-X-LE	C6880-X
Software License	• IP Services • Advanced Enterprise Services	• IP Services • Advanced Enterprise Services
Software compatibility	15.1(2)SY1 and later releases*	15.1(2)SY1 and later releases*

* Support of port card is available on 15.1(2)SY2 and later releases.

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Cisco ONE Software

Cisco ONE Software for Access Switching is available for the Cisco Catalyst 6880-X Series Switch.

Cisco ONE Software is a new way for customers to purchase and use our infrastructure software. It offers a simplified consumption model, centered on common customer scenarios in the data center, WANs, and LANs.

Cisco ONE Software and services provide customers with four primary benefits:

- Software suites that address typical customer use scenarios at an attractive price
- Investment protection of their software purchase through software services-enabled license portability
- Access to ongoing innovation and new technology with Cisco Software Support Service (SWSS)
- Flexible licensing models to smoothly distribute customer's software spend over time

For ordering information for Cisco ONE Software for the Cisco Catalyst 6880-X Series Switch, go to http://www.cisco.com/c/en/us/products/software/one-access/switching-part-numbers.html.

Ordering Information

Table 8 lists the ordering information for the Cisco Catalyst 6880-X Series chassis. To place an order, visit the Cisco ordering homepage.

Table 10. Ordering Information

Product Description	Part Number
Cisco Catalyst 6880-X-Chassis (Standard Tables)	C6880-X-LE
Cisco Catalyst 6880-X-Chassis (XL Tables)	C6880-X
Cisco Catalyst 6880-X Multi Rate Port Card (Standard Tables)	C6880-X-LE-16P10G
Cisco Catalyst 6880-X Multi Rate Port Card (XL Tables)	C6880-X-16P10G
Cisco Catalyst 6880-X 3KW AC Power Supply	C6880-X-3KW-AC
Cisco Catalyst 6880-X 3KW DC Power Supply	C6880-X-3KW-DC
Cisco Catalyst 6880-X Fan Tray	C6880-X-FAN
Mandatory Air Dam set for 6880-X to meet thermal requirement	C6880-X-NEBS-PAK

Warranty Coverage and Technical Service Options

The Cisco Catalyst 6880-X System comes with a Cisco one year hardware warranty. Adding a contract for a technical service offering such as Cisco Smart Net Total Care™ 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 (Table 9), go to http://www.cisco.com/go/ts.

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Table 11. Cisco Technical Services for Cisco Catalyst 6880-X Series Switch

Technical Services
Cisco Smart Net Total Care 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[3] and onsite parts replacement and installation available • Ongoing operating system software updates within the licensed feature set[4] • 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 Smart Net Total Care or SP Base contracts on all network equipment are required.

[3] 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; review the appropriate service descriptions for details.

[4] Cisco operating system updates include the following: maintenance releases, minor updates, and major updates within the icensed feature set.

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For More Information

For more information about the Cisco Catalyst 6880-X Series Switch, visit http://www.cisco.com/en/US/products/hw/switches/index.html.

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