# Cisco Catalyst 6880-X Series Extensible Fixed Aggregation Switch

# Contents

## 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 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.



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

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

**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.

## 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 |
| **Maximum Port Density (VSS)** | Up to 158x 10 Gigabit Ethernet ports Up to 158x 1 Gigabit Ethernet ports |

| Item | Specification |
|---|---|
| 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<br>-48 to -60 VDC |
| Safety | UL 60950 Second Edition<br>CAN/CSA-C22.2 No. 60950 Second Edition<br>EN 60950 Second Edition<br>IEC 60950 Second Edition<br>AS/NZS 60950 |
| EMC | FCC Part 15 (CFR 47) Class A<br>VCCI Class A<br>EN55022 Class A<br>CISPR 22 Class A<br>CE marking<br>AS/NZS 3548 Class A<br>ETS300 386<br>EN55024<br>EN61000-6-1<br>EN50082-1 |
| NEBS/ETSI | GR-1089-Core NEBS Level 3<br>ETS 300 019 Storage Class 1.1<br>ETS 300 019 Transportation Class 2.3<br>ETS 300 019 Stationary Use Class 3.1 |
| ATIS Pb free and Energy efficiency | ATIS-0600020.2010 Pb Free circuit packs<br>ATIS-0600015-2009 General Energy Efficiency Requirements (TEER)<br>ATIS-0600015.03-2009 Switch and Router Energy Efficiency |

| Item | Specification |
|---|---|
| | 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) <br> 0.33°C per minute (cold to hot) |
| Relative Humidity | Ambient (noncondensing) operating: 5% to 90% <br> Ambient (noncondensing) nonoperating and storage: 5% to 95% |
| Operating Altitude | Certified for operation: 0 to 6500 ft (0 to 2000 m) <br> 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) <br> 128K (IPv6) | 2048K (IPv4) <br> 1024K (IPv6) |
| ACL entries | 64K shared for QoS/Security | 256K shared for QoS/Security |
| NetFlow entries | 512K (per module slot) <br> Up to 2.5M per system | 1024K (per module slot) <br> Up to 5M per system |

| Attribute | C6880-X-LE | C6880-X |
|---|---|---|
| Multicast routes | 128K (IPv4)<br>128K (IPv6) | 128K (IPv4)<br>128K (IPv6) |
| IPv4 routing | In hardware<br>Up to 300 Mpps[**] | In hardware<br>Up to 300 Mpps[**] |
| IPv6 routing | In hardware<br>Up to 150 Mpps[**] | In hardware<br>Up to 150 Mpps[**] |
| L2 bridging | In hardware<br>Up to 300 Mpps[**] | In hardware<br>Up to 300 Mpps[**] |
| Jumbo frame support | Up to 9216 bytes<br>(For bridged and routed pkts.) | Up to 9216 bytes<br>(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<br>2.5MB per 10G port in 1:1 mode<br>(10MB per Port ASIC) | 1.25MB per 10G port in 2:1 mode<br>2.5MB per 10G port in 1:1 mode<br>(10MB per Port ASIC) |
| Egress buffers | 24MB per 10G port in 2:1 mode<br>48MB per 10G port in 1:1 mode<br>(192MB per MUX FPGA) | 24MB per 10G port in 2:1 mode<br>48MB per 10G port in 1:1 mode<br>(192MB per MUX FPGA) |
| Oversubscription | 16P 10G at 2:1 in oversubscription mode (default) for base module and port cards<br>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)<br>128K (IPv6) | 2048K (IPv4)<br>1024K (IPv6) |
| ACL entries | 64K shared for QoS/Security | 256K shared for QoS/Security |
| NetFlow entries | 512K (per module slot)<br>Up to 2.5M per system | 1024K (per module slot)<br>Up to 5M per system |
| Multicast routes | 128K (IPv4)<br>128K (IPv6) | 128K (IPv4)<br>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 |
| 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<br>Configurable: 2p6q4t | Default: 1p7q4t<br>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 |

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 |

[*] For optimal performance, it is recommended to use chassis with similar memory capacity

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 |

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 |

| Category | Optics |
|---|---|
| | 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<br>• Advanced Enterprise Services | • IP Services<br>• 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.

# 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 https://www.cisco.com/c/en/us/products/software/one-access/switching-part-numbers.html.

## Ordering Information

Table 10 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 https://www.cisco.com/go/warranty.

For information about Cisco Technical Services (Table 11), go to https://www.cisco.com/go/ts.

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

| Technical Services |
|---|
| **Cisco Smart Net Total Care Service**<br>● Around-the-clock, global access to the Cisco Technical Assistance Center (TAC)<br>● Unrestricted access to the extensive Cisco.com resources, communities, and tools<br>● Next-business-day, 8x5x4, 24x7x4, and 24x7x2 advance hardware replacement[3] and onsite parts replacement and installation available<br>● Ongoing operating system software updates within the licensed feature set[4]<br>● Proactive diagnostics and real-time alerts on Smart Call Home enabled devices |

| Technical Services |
|---|
| **Cisco Focused Technical Support Services** |
| Three levels of premium, high-touch services are available: |
| <ul><li>Cisco High-Touch Operations Management Service</li><li>Cisco High-Touch Technical Support Service</li><li>Cisco High-Touch Engineering Service</li></ul> |
| 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 licensed feature set.

## Cisco Capital

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## For More Information

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

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