

# CloudEngine 6880 Series Data Center Switches



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## Product Overview

Huawei CloudEngine 6880 (CE6880 for short) series switches are next-generation 10G Ethernet access switches designed for data centers and high-end campus networks, providing high performance, high-density 10GE ports, and low latency. The switches have an advanced hardware architecture with 40GE/100GE uplink ports and the industry's highest density of 10GE access ports.

Using the Huawei VRP8 software platform, CE6880 switches provide extensive data center service features and high stacking capability. In addition, the airflow direction (front-to-back or back-to-front) can be changed. CE6880 switches can work with CE12800 switches to build an elastic, virtualized, high-quality 40GE/100GE fully-connected fabric that meets the requirements of cloud-computing data centers.

CE6880 switches provide high-density 10GE access to help enterprises and carriers build a scalable data center network platform in the cloud computing era. They can also be used as aggregation or core switches for enterprise campus networks.

## Product Appearance

The CE6880 series includes the following models.

### CE6880-48T4Q2CQ-EI



48\*10GE Base-T ports and 6\*40GE QSFP+ ports,  
Or 44\*10GE Base-T ports, 4\*40GE QSFP+ ports, and 2\*100GE QSFP28 ports

### CE6880-48S4Q2CQ-EI



48\*10GE SFP+ ports and 6\*40GE QSFP+ ports,  
Or 44\*10GE SFP+ ports, 4\*40GE QSFP+ ports, and 2\*100GE QSFP28 ports

### CE6880-24S4Q2CQ-EI



24\*10GE SFP+ ports, 4\*40GE QSFP+ ports, 2\*100GE QSFP28 ports

## Product Characteristics

### High-Density 10GE Access

- The CE6880 provides up to 48\*10GE ports, the highest 10GE port density among 1U ToR switches, allowing for high density 10GE server access and smooth evolution.
- The CE6880 provides four 40GE QSFP+ ports and two 100GE QSFP28 ports. Each QSFP28 port can also be used as one 40GE QSFP+ port, providing flexibility in networking. The 40GE/100GE uplink ports can be connected to CE12800 switches to build a non-blocking network platform.

### Highly Reliable, High-Performance Stacking

- The industry's first 16-member stack system
  - » A stack system of 16 member switches has a maximum of 768\*10GE access ports that provide high-density server access in a data center.
  - » Multiple switches in a stack system are virtualized into one logical device, making it possible to build a scalable, easy-to-manage data center network platform.
  - » A stack system separates the control plane from the data plane. This eliminates the risk of single-point failures and greatly improves system reliability.
- Long-distance stacking
  - » The CE6880 can use service ports as stack ports. A stack system can be established with switches in the same rack or different racks, and even over long distances.
  - » Service and stack bandwidth can be allocated based on the network scale so that network resources can be used more efficiently.

### Software-Defined Chip for On-demand Innovation

- The CE6880 uses Huawei's unique programmable chip – Ethernet Network Processor 2.0 (ENP 2.0) and is the first data center switch that provides openness and in-depth definition capability on the forwarding plane. The forwarding plane programmability greatly shortens the new service provisioning period, enabling fast service innovation.
- The CE6880 supports software-defined network functions and allows for fast functional expansion. This helps to reduce the CAPEX because customers do not need to replace hardware devices to support new services.
- The CE6880 supports IP packet fragmentation and reassembling, enabling oversized IP packets to travel across a WAN network without limited by the MTU.
- The Segment Routing (SR) capability of the CE6880 implements label-based packet forwarding, regardless of service types. This feature enables automatic optimization and switching of end-to-end links.

## Real-Time Health Check and Precision Management

- The CE6880 supports global precision time synchronization based on IEEE 1588v2, which achieves nanosecond-level delay detection.
- Huawei's Packet Conservation Algorithm for Internet (iPCA) technology implements accurate per-hop packet loss, delay, and jitter measurement for real service flows, so that network problems can be located quickly.
- The CE6880 provides proactive path detection on the entire network. It periodically checks sample flows to determine connectivity of all paths on the network and locates failure points, enabling you to know the network health in real time.
- The CE6880 supports service-oriented Dynamic Load Balancing (DLB). It can accurately identify elephant, mice, and real-time flows, and adjust service paths accordingly.

## Inter-device Link Aggregation, High Efficiency and Reliability

- The CE6880 supports multichassis link aggregation group (M-LAG), which enables links of multiple switches to aggregate into one to implement device-level link backup.
- Switches in an M-LAG system all work in active state to share traffic and back up each other, enhancing system reliability.
- Switches in an M-LAG system can be upgraded independently. During the upgrade, other switches in the system take over traffic forwarding to ensure uninterrupted services.
- M-LAG supports dual-homing to Ethernet, TRILL, VxLAN, and IP networks, allowing for flexible networking.

## Hardware Overlay Gateway Achieves Fast Service Deployment

- The CE6880 can work with a mainstream virtualization platform. As the high-performance hardware gateway of an overlay network (VxLAN), the CE6880 can support more than 16 million tenants.
- The CE6880 can connect to a cloud platform using open API, allowing for unified management of software and hardware networks.
- The hardware gateway deployment enables fast service deployment without changing the customer network, providing investment protection.
- The CE6880 supports Border Gateway Protocol - Ethernet VPN (BGP-EVPN), which can run as the VxLAN control plane to simplify VxLAN configuration within and between data centers.

## Full Openness and Programmability, Flexible Customization

- The CE6880 uses the Open Programmability System (OPS) embedded in the VRP8 software platform to provide programmability at the control plane.
- The OPS provides open APIs. APIs can be integrated with mainstream cloud platforms (including commercial and open cloud platforms) and third-party controllers. The OPS enables services to be flexibly customized and provides automatic management.

- Users or third-party developers can use open APIs to develop and deploy specialized network management policies to implement extension of fast service functions, automatic deployment, and intelligent management. The OPS also implements automatic operation and maintenance, and reduces management costs.
- The CE6880 supports Puppet automation software, which enables unified provisioning of physical and virtual networks.
- The CE6880 can seamlessly integrate with systems of F5, an industry-leading application delivery network provider, to build an active-active data center network.
- The OPS provides seamless integration of data center service and network in addition to a service-oriented, Software-Defined Network (SDN).

### Zero Touch Provisioning, Automatic O&M

- The CE6880 supports Zero Touch Provisioning (ZTP). ZTP enables the CE6880 to automatically obtain and load version files from a USB flash drive or file server, freeing network engineers from onsite configuration or deployment. ZTP reduces labor costs and improves device deployment efficiency.
- ZTP provides built-in scripts for users through open APIs. Data center personnel can use the programming language they are familiar with, such as Python, to provide unified configuration of network devices.
- ZTP decouples configuration time of new devices from device quantity and area distribution, which improves service provisioning efficiency.

### Flexible Airflow Design, High Energy Efficiency

- Flexible front-to-back/back-to-front airflow design
  - » The CE6880 uses a front-to-back/back-to-front airflow design that isolates cold air channels from hot air channels. This design meets heat dissipation requirements in data center equipment rooms.
  - » Air can flow from front to back, or back to front when different fans and power modules are used.
  - » Redundant power modules and fans can be configured to ensure uninterrupted service transmission.
- Energy-saving technology
  - » The CE6880 series switches have energy-saving chips and can measure system power consumption in real time. Fan speed can be adjusted dynamically based on system consumption. These energy-saving technologies reduce O&M costs and contribute to a greener data center.

### Clear Indicators, Simple Maintenance

- Clear indicators
  - » Port indicators clearly show port status and port speeds. The 100GE port indicators can show the states of all ports derived from the 100GE ports.
  - » State and stack indicators on both the front and rear panels enable operators to maintain the switch from either side.

- » The CE6880 series switches support remote positioning. Operators can turn on remote positioning indicators on the switches they want to maintain, so that they can find switches easily in an equipment room full of devices.
- Simple maintenance
  - » The management port, fans, and power modules are on the front panel, which facilitates device maintenance.
  - » Data ports are located at the rear, facing servers. This simplifies cabling.

## Product Specifications

Item	CE6880-48S4Q2CQ-EI	CE6880-24S4Q2CQ-EI	CE6880-48T4Q2CQ-EI
10GE Base-T ports	NA	NA	48
10GE SFP+ ports	48	24	NA
40GE QSFP+ ports	4	4	4
100GE QSFP28 ports	2	2	2
Switching capacity	1.6 Tbps		
Airflow design	Front-to-back or back-to-front		
Device virtualization	iStack <sup>1</sup>		
Network virtualization	M-LAG		
	TRILL		
	VxLAN		
	BGP-EVPN		
	QinQ in VxLAN		
VM awareness	Agile Controller		
Network convergence	FCoE		
	DCBX, PFC, ETS		
SDN feature	OPS		
Programmability	OpenFlow protocol		
	ENP programming		
	OPS programming		
	Puppet, OVSDDB, and Ansible plugins released on open source websites		
	Open programming environment based on Linux containers for open-source and customized programs		

1. For details about the configuration, please see:  
[http://support.huawei.com/online/tools/web/virtual/en/dc/stack\\_index.html?dcb](http://support.huawei.com/online/tools/web/virtual/en/dc/stack_index.html?dcb)

Item	CE6880-48S4Q2CQ-EI	CE6880-24S4Q2CQ-EI	CE6880-48T4Q2CQ-EI
Traffic analysis	NetStream		
	Hardware-based sFlow		
VLAN	Adding access, trunk, and hybrid interfaces to VLANs		
	Default VLAN		
	QinQ		
	MUX VLAN		
	GVRP		
ACL	7.5k (Ingress and Egress share)		
MAC address table	Maximum:256k		
	Dynamic learning and aging of MAC addresses		
	Static, dynamic, and blackhole MAC address entries		
	Packet filtering based on source MAC addresses		
	MAC address limiting based on ports and VLANs		
ARP	Maximum:128k		
IPv4 FIB	Maximum:176k		
IP routing	IPv4 routing protocols, such as RIP, OSPF, IS-IS, and BGP		
	IPv6 routing protocols, such as RIPng, OSPFv3, IS-ISv6, and BGP4+		
	IP packet fragmentation and reassembling		
IPv6 FIB	Maximum:32k		
IPv6	IPv6 over VxLAN		
	IPv6 over IPv4		
	IPv6 Neighbor Discovery (ND)		
	Path MTU Discovery (PMTU)		
	TCP6, ping IPv6, tracer IPv6, socket IPv6, UDP6, and Raw IP6		
Multicast IPv4 FIB	32k		
Multicast IPv6 FIB	4k		

Item	CE6880-48S4Q2CQ-EI	CE6880-24S4Q2CQ-EI	CE6880-48T4Q2CQ-EI
Multicast	IGMP, PIM-SM, PIM-DM, MSDP, and MBGP		
	IGMP snooping		
	IGMP proxy		
	Fast leave of multicast member interfaces		
	Multicast traffic suppression		
	Multicast VLAN		
MPLS	Multiprotocol label switching		
Reliability	Link Aggregation Control Protocol (LACP)		
	STP, RSTP, and MSTP		
	BPDU protection, root protection, and loop protection		
	Smart Link and multi-instance		
	Device Link Detection Protocol (DLDP)		
	Ethernet Ring Protection Switching (ERPS, G.8032)		
	Hardware-based Bidirectional Forwarding Detection (BFD)		
	VRRP, VRRP load balancing, and BFD for VRRP		
	BFD for BGP/IS-IS/OSPF/Static route		
	Segment Routing (SR)		
QoS	Traffic classification based on Layer 2 header, Layer 3 protocol, Layer 4 protocol, and priority		
	Actions of ACL, CAR, re-marking, and scheduling		
	Queue scheduling algorithms, including PQ, WRR, DRR, PQ+WRR, and PQ+DRR		
	Congestion avoidance mechanisms, including WRED and tail drop		
O&M	Traffic shaping		
	IEEE 1588v2		
	Packet Conservation Algorithm for Internet (iPCA)		
	Dynamic Load Balancing (DLB)		
	Dynamic Packet Prioritization (DPP)		
	Network-wide path detection		
Microsecond-level buffer detection			



Item	CE6880-48S4Q2CQ-EI	CE6880-24S4Q2CQ-EI	CE6880-48T4Q2CQ-EI
Configuration	Console, Telnet, and SSH terminals		
	Network management protocols, such as SNMPv1/v2c/v3		
	File upload and download through FTP and TFTP		
	BootROM upgrade and remote upgrade		
	Hot patches		
	User operation logs		
	ZTP		
Security and management	802.1x authentication		
	Command line authority control based on user levels, preventing unauthorized users from using commands		
	DoS, ARP, and ICMP attack defenses		
	Port isolation, port security, and sticky MAC		
	Binding of the IP address, MAC address, interface number, and VLAN ID		
	Authentication methods, including AAA, RADIUS, and HWTACACS		
	Remote Network Monitoring (RMON)		
Dimensions (W x D x H)	442 x 420 x 43.6 mm (17.4 x 16.5 x 1.72 in)	442 x 420 x 43.6 mm (17.4 x 16.5 x 1.72 in)	442 x 420 x 43.6 mm (17.4 x 16.5 x 1.72 in)
Weight (fully loaded)	8.7 kg (19.18 lb)	8.5 kg (18.74 lb)	8.9 kg (19.62 lb)
Environmental parameters	Operating temperature: 0°C to 40°C (32°F to 104°F) (0 m to 1,800 m) Storage temperature: -40°C to +70°C (-40°F to 158°F) Relative humidity: 5% RH to 95% RH, non-condensing		
Operating voltage	AC: 90 V to 290 V DC: -38.4 V to -72 V	AC: 90 V to 290 V DC: -38.4 V to -72 V	AC: 90 V to 290 V
Maximum power consumption	267 W	224 W	430 W

## Ordering Information

### Mainframe

CE6880-48S4Q2CQ-EI	CE6880-48S4Q2CQ-EI Switch(48*10G SFP+,6*40G QSFP+ or 44*10G SFP+, 4*40G QSFP+,2*100G QSFP28,Without Fan and Power Module)
CE6880-EI-F-B0A	CE6880-48S4Q2CQ-EI Switch(48*10G SFP+,6*40G QSFP+ or 44*10G SFP+, 4*40G QSFP+,2*100G QSFP28,2*AC Power Module,2*FAN Box,Port-side Exhaust)

CE6880-EI-B-B0A	CE6880-48S4Q2CQ-EI Switch(48*10G SFP+,6*40G QSFP+ or 44*10G SFP+, 4*40G QSFP+,2*100G QSFP28,2*AC Power Module,2*FAN Box,Port-side Intake)
CE6880-24S4Q2CQ-EI	CE6880-24S4Q2CQ-EI Switch(24*10G SFP+,4*40G QSFP+,2*100G QSFP28, Without Fan and Power Module)
CE6880-EI-F-B0B	CE6880-24S4Q2CQ-EI Switch(24*10G SFP+,4*40G QSFP+,2*100G QSFP28, 2*AC Power Module,2*FAN Box,Port-side Exhaust)
CE6880-EI-B-B0B	CE6880-24S4Q2CQ-EI Switch(24*10G SFP+,4*40G QSFP+,2*100G QSFP28, 2*AC Power Module,2*FAN Box,Port-side Intake)
CE6880-48T4Q2CQ-EI	CE6880-48T4Q2CQ-EI Switch(48*10G RJ45,6*40G QSFP+ or 44*10G RJ45, 4*40G QSFP+,2*100G QSFP28,Without Fan and Power Module)
CE6880-EI-F-B00	CE6880-48T4Q2CQ-EI Switch(48*10G RJ45,6*40G QSFP+ or 44*10G RJ45, 4*40G QSFP+,2*100G QSFP28,2*AC Power Module,2*FAN Box,Port-side Exhaust)
CE6880-EI-B-B00	CE6880-48T4Q2CQ-EI Switch(48*10G RJ45,6*40G QSFP+ or 44*10G RJ45, 4*40G QSFP+,2*100G QSFP28,2*AC Power Module,2*FAN Box,Port-side Intake)

#### Fan trays

Part Number	Product Description	Support Product
FAN-40HA-F	Fan box (HA, Front to Back, FAN panel side intake)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI CE6880-48T4Q2CQ-EI
FAN-40HA-B	Fan box (HA, Back to Front, FAN panel side exhaust)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI CE6880-48T4Q2CQ-EI

#### Power

Part Number	Product Description	Support Product
PAC-600WA-F	600W AC Power Module (Front to Back, Power panel side intake)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI CE6880-48T4Q2CQ-EI
PAC-600WA-B	600W AC Power Module (Back to Front, Power panel side exhaust)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI CE6880-48T4Q2CQ-EI
PDC-350WA-F	350W DC Power Module (Front to Back, Power panel side intake)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI
PDC-350WA-B	350W DC Power Module (Back to Front, Power panel side exhaust)	CE6880-48S4Q2CQ-EI CE6880-24S4Q2CQ-EI

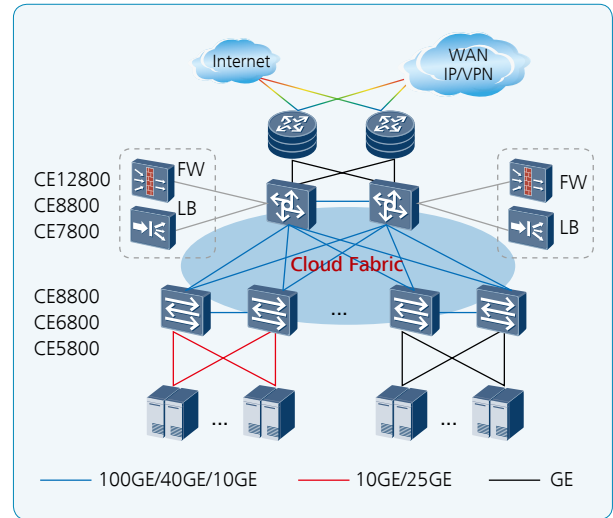
#### Software

CE68-LIC-VxLAN	CloudEngine 6800 VxLAN Function
CE68-LIC-FCF16	CloudEngine 6800 FCF 16 Ports
CE68-LIC-FCFAL	CloudEngine 6800 FCF All Ports
CE6800-LIC-NPV	CloudEngine 6800 FCOE NPV Function
CE6800-LIC-SFC	CloudEngine 6800 SFC Function

## Networking and Applications

### Data Center Applications

On a typical data center network, CE12800/CE8800/CE7800 switches work as core switches, and CE6880 switches work as ToR switches. 40GE/100GE ports of CE6880 switches can connect to CE12800/CE8800 core switches to provide a fully connected 100GE solution, or connected to CE8800/CE7800 switches for smooth evolution to a fully connected 100GE solution. The core and ToR switches use fabric technology such as VxLAN to establish a non-blocking large Layer 2 network, which allows large-scale VM migrations and flexible service deployments.



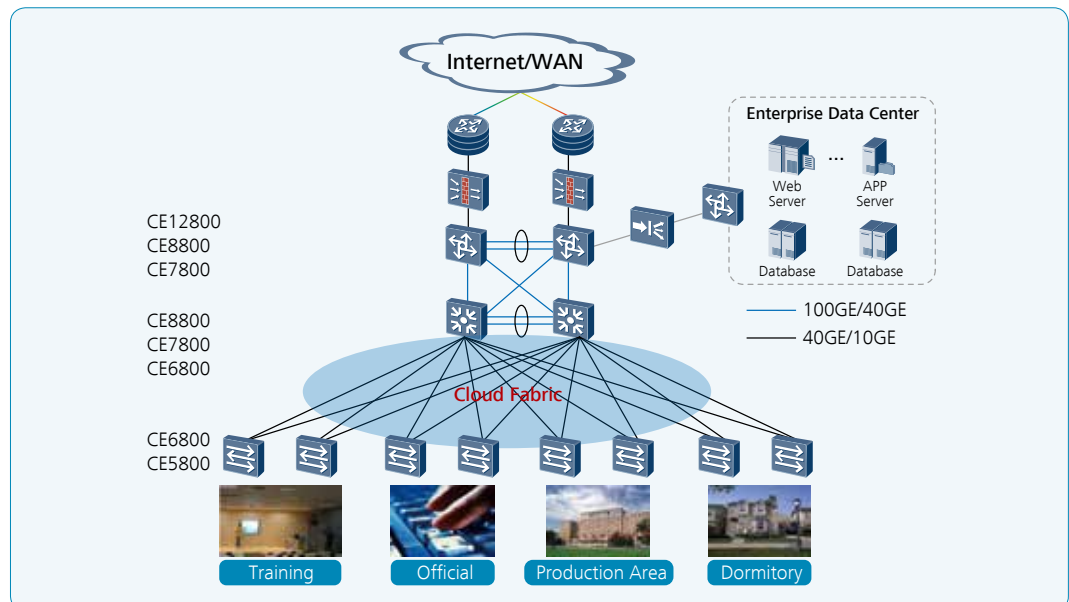
Note: VxLAN can be also used on campus networks to support flexible service deployments in different service areas.

### Campus Network Applications

CE6880 switches can be used as aggregation or core switches on a campus network. Their high-density, line-rate 10GE ports and high stacking capability can meet the ever-increasing demand for network bandwidth. CE6880 switches are cost-effective campus network switches, thanks to their extensive service features and innovative energy-saving technologies.

On a typical campus network, multiple CE12800/CE8800/CE7800 switches are virtualized into a logical core switch using CSS or iStack technology. Multiple CE8800/CE7800/CE6800 switches at the aggregation layer form a logical switch using iStack technology. CSS and iStack improve network reliability and simplify network management. At the access layer, CE6800/CE5800 switches are virtualized with cloud fabric technology, such as iStack or M-LAG (vertical virtualization), to provide high-density line-rate ports.

Note: CSS, iStack, and M-LAG are also widely used in data centers to facilitate network management.



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