Huawei CloudEngine 5880 Series Data Center Switches

HUAWEI TECHNOLOGIES CO., LTD.

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Product Overview

Huawei CloudEngine 5880 (CE5880 for short) series switches are next-generation, high-density Gigabit Ethernet switches designed for data centers and high-end campus networks . The CE5880 has an advanced hardware architecture with 40GE uplink ports and the industry's highest density of GE access ports. Using Huawei's VRP8 software platform, CE5880 series switches support extensive data center features and high stacking capabilities. In addition, the CE5880 uses a flexible airflow design (front-to-back or back-to-front). CE5880 switches can work with Huawei CE12800 series data center core switches to build elastic, virtual, and high-quality fabric that meets requirements of cloud computing data centers.

CE5880 series switches provide high-density GE access to help enterprises and carriers build a scalable data center network platform in the cloud computing era.

Product Appearance

CE5880 series switches are available in one model.

CE5880-48T6Q-EI

44 x GE RJ45 ports, 4 x 10GE RJ45 ports, and 6 x 40GE QSFP+ ports

Product Characteristics

High-Density GE Access

- The CE5880 provides up to 44*GE and 4 x 10GE RJ 45 line-speed ports, allowing for high-density GE server access and smooth evolution.
- The CE5880 provides up to 6 x 40GE QSFP+ ports. The uplink 40GE ports can be connected to CE12800 series switches to build a non-blocking network platform.

Highly Reliable, Long-Distance Stacking

- Industry's first 16-member stack system
  - » A stack system of 16 member switches has a maximum of 704 x GE 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 and easy-to-manage data center network platform.
  - » A stack system separates the control plane from the data plane. This eliminates the risk of single points of failure and greatly improves system reliability.
- Long-distance stacking
  - » The CE5880 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 bandwidths can be allocated based on the network scale to ensure that network resources are used more efficiently.

Inter-device Link Aggregation, High Efficiency and Reliability

- The CE5880 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, VXLAN, and IP networks, allowing for flexible networking.

Virtualized Hardware Gateway, Enabling Quick Deployment

- The CE5880 can connect to a cloud platform through open APIs, facilitating the unified management of virtual and physical networks.
- The CE5880 can work with the industry's mainstream virtualization platforms. The virtualization function protects investments by ensuring services can be deployed quickly without requiring network changes.
- The hardware gateway deployment enables fast service deployment without changing the customer network, providing investment protection.
- The CE5880 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.

Standard Interfaces, Enabling Openness and Interoperability

- The CE5880 supports NETCONF and can work with Huawei Agile Controller.
- The CE5880 supports Ansible-based automatic configuration and open-source module release, expanding network functions and simplifying device management and maintenance.
- The CE5880 series switches can be integrated into mainstream SDN and cloud computing platforms flexibly and quickly.

ZTP, Implementing Automatic O&M

- The CE5880 supports Zero Touch Provisioning (ZTP). ZTP enables the CE5880 to automatically obtain and load version files from a USB flash drive or file server, freeing network engineers from onsite configuration and deployment. ZTP reduces labor costs and improves device deployment efficiency.
- ZTP provides built-in scripts through open APIs. Data center personnel can use a programming

language they are familiar with, such as Python, to centrally configure network devices.

- ZTP decouples the configuration time of new devices from the device quantity and area distribution, which improves service provisioning efficiency.

FabricInsight-based Intelligent O&M

- The CE5880 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 detection for real service flows, locating network faults in real time.
- The CE5880 proactively performs path detection over the entire network. It periodically checks sample flows to determine the connectivity of all paths on the network and locates fault points, providing real-time network health information.
- The CE5880 supports visualization of all flows and congestion, improving service experience.

Flexible Airflow Design, Improving Energy Efficiency

- Flexible front-to-back/back-to-front airflow design
  - » The CE5880 uses a strict front-to-back/back-to-front airflow design that isolates cold air channels from hot air channels. This design improves heat dissipation efficiency and meets design requirements of data center equipment rooms.
  - » Air can flow from front to back or back to front depending on the fans and power modules that are used.
  - » Redundant power modules and fans can be configured to ensure service continuity.
- Innovative energy-saving technologies
  - » The CE5880 has innovative energy-saving chips and can measure system power consumption in real time. The 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, Simplifying Maintenance

- Clear indicators
  - » Port indicators clearly show the port status and port rate.
  - » State and stack indicators on both the front and rear panels enable users to maintain the switch from either side.
  - » The CE5880 supports remote positioning. Remote positioning indicators enable users to easily identify the switches they want to maintain 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[1]

Item	CE5880-48T6Q-EI
Device virtualization	iStack[2]
	M-LAG
Network virtualization	VXLAN
	BGP-EVPN
	QinQ access VXLAN
SDN	Agile Controller
Programmability	OPS programming
	OpenFlow
	Ansible-based automatic configuration and open-source module release
Traffic analysis	NetStream
VLAN	Adding access, trunk, and hybrid interfaces to VLANs
	Default VLAN
	QinQ
MAC address	Dynamic learning and aging of MAC address entries
	Static, dynamic, and blackhole MAC address entries
	Packet filtering based on source MAC addresses
	MAC address limiting based on ports and VLANs
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 reassembly
IPv6	IPv6 Neighbor Discovery (ND)
	Path MTU Discovery (PMTU)
	TCP6, ping IPv6, tracert IPv6, socket IPv6, UDP6, and Raw IP6

1.This content is applicable only to regions outside mainland China. Huawei reserves the right to interpret this content
2.For details about the configuration, please see: http://support.huawei.com/onlinetoolsweb/virtual/en/dc/stack_index.html?dcb

Item	CE5880-48T6Q-EI
Multicast	Multicast routing protocols such as IGMP, PIM-SM, and MBGP
	IGMP snooping
	IGMP proxy
	Fast leaving of multicast member interfaces
	Multicast traffic suppression
	Multicast VLAN
Reliability	Fine-grained microsegmentation isolation
	Link Aggregation Control Protocol (LACP)
	STP, RSTP, and MSTP
	Smart Link and multi-instance
	Device Link Detection Protocol (DLDP)
	Hardware-based Bidirectional Forwarding Detection (BFD) at an interval
	VRRP, VRRP load balancing, and BFD for VRRP
	BFD for BGP/IS-IS/OSPF/Static route
	BFD for VXLAN
QoS	Traffic classification based on Layer 2, Layer 3, Layer 4, and priority information
	ACL, CAR, re-marking, and scheduling
	Queue scheduling modes such as SP,DWRR,SP+DWRR
	Congestion avoidance mechanisms, including WRED and tail drop
	Traffic shaping
O&M	IEEE 1588v2
	iPCA
	Network-wide path detection
	Telemetry
	Statistics on the buffer microburst status
	VXLAN OAM: VXLAN ping and VXLAN tracert

Item	CE5880-48T6Q-EI
Configuration and maintenance	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
	Zero Touch Provisioning (ZTP)
Security and management	Command line authority control based on user levels, preventing unauthorized users from using commands
	Defense against DoS address attacks, ARP storms, and ICMP attacks
	Port isolation, port security, and sticky MAC
	Binding of the IP address, MAC address, port number, and VLAN ID
	Authentication methods, including AAA, RADIUS, and HWTACACS
	Remote Network Monitoring (RMON)

Performance and Scalability

Item	CE5880-48T6Q-EI
Maximum number of MAC address entries	176K
Maximum number of Forwarding routes (FIB IPv4/ IPv6)	128K/64K
ARP table size	128K
Maximum number of VRF	16384
IPv6 ND(Neighbour Discovery) table size	32K
Maximum Number of multicast routes (Multicast FIB IPv4/IPv6)	132K/NA
Maximum VRRP groups	1024
Maximum number of ECMP paths	32

Item	CE5880-48T6Q-EI
Maximum ACL number	64K
Maximum Number of broadcast domains	8000
Maximum number of BDIF	8000
Maximum number of tunnel endpoints (VTEP)	16K
Maximum number of lag group	1024/512/256/128/64
Maximum number of links in a lag group	2/4/8/16/32
Maximum number of MSTP instance	64

Note

This specification may vary between different scenarios. Please contact Huawei for details.

Hardware Specifications

Item		CE5880-48T6Q-EI
Physical Features	Dimensions (W × D ×H ,mm)	442*420*43.6
	Weight (excluding optical modules, power modules, and fan assemblies / including AC power modules and fan assemblies, excluding optical modules ,kg)	6.3/9.1
	Switching capacity(Gbit/s)	648
	Forwarding performance(Mpps)	406
Number of GE Base-T ports		44
Number of 10GE Base-T ports		4
40GE QSFP+ ports		6
Card	Number of card slot	0
	Card type	Fixed Switch

Item		CE5880-48T6Q-EI
Management interface	Out-of-band management port	1*GE management interface
	Console port	1*RJ45 interface
	USB port	1
CPU	Main frequency(HZ)	1.5G
	Number of cores	8
Storage	RAM	2GB
	NOR Flash	32MB
	NAND Flash	1GB
System	System buffer	16.5MB
Power Supply System	Power modules	600 W AC
	Rated voltage range(V)	100 V to 240 V AC
	Maximum voltage range(V)	90~290 AC
	Maximum input current	100 V to 240 V 9 A
	Typical power	120W(100% traffic load, copper cable, normal temperature, dual power modules) 139W(100% traffic load, short-distance optical modules, normal temperature, dual power modules)
	Maximum power	224W
	Frequency (AC ,HZ)	50/60
Heat Dissipation	Heat dissipation mode	Air cooling
	Number of fans	2
	Heat dissipation airflow	Front-to-back or back-to-front airflow
	Maximum heat consumption (BTU/hr)	833

Item		CE5880-48T6Q-EI
Environment specifications	Long-term operating temperature(°C)	0 to 40°C(0-1800m) The temperature decreases by 1°C each time the altitude increases by 220 m.
	Storage temperature(°C)	-40°to +70°C
	Relative humidity	5% to 95%
	Operating altitude(m)	Up to 5000
	Sound power at 27°C (dBA)	Front-to-back airflow: < 65 Back-to-front airflow: < 68
	Sound power at 40°C (dBA)	Front-to-back airflow: < 88 Back-to-front airflow: < 86
	Sound pressure at 27°C (dBA)	Front-to-back airflow: 47 in average (maximum: 52) Back-to-front airflow: 46 in average (maximum: 52)
	Surge protection	AC power supply protection: 6 kV in common mode and 6 kV in differential mode
Reliability	MTBF (year)	61.41
	MTTR (hour)	1.78
	Availability	0.99999668259

Note

For detailed information of CloudEngine 5880 Platform hardware information, visit https://support.huawei.com/enterprise/en/doc/EDOC1000019246?idPath=7919710%7C21782165%7C21782239%7C22318540%7C7597815

Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of CE 5880 series switches.

Certification Category	Description
Safety	• EN 60950-1: 2006+A11: 2009+A1: 2010+A12: 2011 • EN 60825-1: 2007 • EN 60825-2:2010 • UL 60950-1: 2007 2nd Edition • CSA C22.2 No.650: 2007 2nd Edition • IEC 60950-1: 2005+A1: 2009 • AS/NZS 60950-1: 2011 • GB4943: 2011
Electromagnetic Compatibility (EMC)	• FCC 47CFR Part15 CLASS A • ETSI EN 300 386 V1.6.1: 2012 • ICES-003: 2012 CLASS A • CISPR 22: 2008 CLASS A • CISPR 24: 2010 • EN 55022: 2010 CLASS A • EN 55024: 2010 • AS/NZS CISPR 22: 2009 CLASS A • IEC 61000-3-2: 2005+A1: 2008+A2: 2009/EN 61000-3-2: 2006+A1: 2009+A2: 2009 • IEC 61000-3-3: 2008/EN 61000-3-3: 2008 • CNS 13438: 2006 CLASS A • VCCI V-4: 2012 CLASS A • VCCI V-3: 2012 CLASS A • EC Council Directive 2004/108/EC • GB9254
Environment	• 2002/95/EC, 2011/65/EU • 2002/96/EC, 2012/19/EU • EC NO.1907/2006 • ETSI EN 300 019-1-1 V2.1.4 • ETSI EN 300 019-1-2 V2.1.4 • ETSI EN 300 019-1-3 V2.3.2 • ETSI EN 300753 V1.2.1

Note

EMC: electromagnetic compatibility

CISPR: International Special Committee on Radio Interference

EN: European Standard

ETSI: European Telecommunications Standards Institute

CFR: Code of Federal Regulations

FCC: Federal Communication Commission

IEC: International Electrotechnical Commission

AS/NZS: Australian/New Zealand Standard

VCCI: Voluntary Control Council for Interference

UL: Underwriters Laboratories

CSA: Canadian Standards Association

IEEE: Institute of Electrical and Electronics Engineers

RoHS: restriction of the use of certain hazardous substances

REACH: Registration Evaluation Authorization and Restriction of Chemicals

WEEE: Waste Electrical and Electronic Equipment

Supported MIBs

The following table lists the MIBs supported by CE 5880 series switches.

Category	MIB
Public MIB	• BRIDGE-MIB • BGP4-MIB • BRIDGE-MIB • DISMAN-PING-MIB • DISMAN-TRACEROUTE-MIB • ENTITY-MIB • IF-MIB • IP-FORWARD-MIB • IP-MIB • IPv6-ICMP-MIB • IPv6-MIB • IPv6-TCP-MIB • IPv6-UDP-MIB • ISIS-MIB • LAG-MIB • LLDP-EXT-DOT1-MIB • LLDP-EXT-DOT3-MIB • LLDP-MIB • MAU-MIB • MGMD-STD-MIB • MSDP-MIB • NOTIFICATION-LOG-MIB • NQA-MIB • OSPF-MIB • OSPF-TRAP-MIB • OSPFV3-MIB • P-BRIDGE-MIB • PIM-BSR-MIB • PIM-STD-MIB • Q-BRIDGE-MIB • RADIUS-AUTH-CLIENT-MIB • RFC1213-MIB • RIPv2-MIB • RMON-MIB • SNMP-FRAMEWORK-MIB • SNMP-MPD-MIB • SNMP-NOTIFICATION-MIB • SNMP-PROXY-MIB • SNMP-TARGET-MIB • SNMP-USER-BASED-SM-MIB • SNMPv2-MIB • SNMP-VIEW-BASED-ACM-MIB • TCP-MIB • UDP-MIB • VRRP-MIB

Category	MIB
Huawei-proprietary MIB	• HUAWEI-AAA-MIB • HUAWEI-ACL-MIB • HUAWEI-ALARM-MIB • HUAWEI-BASE-TRAP-MIB • HUAWEI-BFD-MIB • HUAWEI-BGP-VPN-MIB • HUAWEI-BRAS-RADIUS-MIB • HUAWEI-CBQOS-MIB • HUAWEI-CE-PING-MIB • HUAWEI-CONFIG-MAN-MIB • HUAWEI-CPU-MIB • HUAWEI-DAD-MIB • HUAWEI-DATASYNC-MIB • HUAWEI-DEVICE-MIB • HUAWEI-DEVICE-EXT-MIB • HUAWEI-DHCPR-MIB • HUAWEI-DHCP-SNOOPING-MIB • HUAWEI-DHCPV6-SERVER-MIB • HUAWEI-DLDP-MIB • HUAWEI-ENERGYMNGT-MIB • HUAWEI-ENTITY-TRAP-MIB • HUAWEI-ENTITY-EXTENT-MIB • HUAWEI-ERRORDOWN-MIB • HUAWEI-ETHARP-MIB • HUAWEI-EVC-MIB • HUAWEI-FLASH-MAN-MIB • HUAWEI-FTP-MIB • HUAWEI-FWD-RES-TRAP-MIB • HUAWEI-FWD-PAF-TRAP-MIB • HUAWEI-GTL-MIB • HUAWEI-HWTACACS-MIB • HUAWEI-INFOCENTER-MIB • HUAWEI-IF-EXT-MIB • HUAWEI-IPFPM-MIB • HUAWEI-ISIS-CONF-MIB • HUAWEI-L2IF-MIB • HUAWEI-L2MAM-MIB • HUAWEI-L2MULTICAST-MIB • HUAWEI-L2VLAN-MIB • HUAWEI-LINE-MIB • HUAWEI-LLDP-MIB • HUAWEI-M-LAG-MIB • HUAWEI-MEMORY-MIB • HUAWEI-MFLP-MIB • HUAWEI-MIB • HUAWEI-MSTP-MIB • HUAWEI-ND-MIB • HUAWEI-NETCONF-MIB • HUAWEI-NETSTREAM-MIB • HUAWEI-NTP-TRAP-MIB • HUAWEI-NVO3-MIB • HUAWEI-OPENFLOW-MIB • HUAWEI-OSPFV2-MIB

Category	MIB
Huawei-proprietary MIB	• HUAWEI-OSPFV3-MIB • HUAWEI-OVSDB-MIB • HUAWEI-PERFMGMT-MIB • HUAWEI-PIM-STD-MIB • HUAWEI-PORT-MIB • HUAWEI-RIPv2-EXT-MIB • HUAWEI-RM-EXT-MIB • HUAWEI-SECURITY-MIB • HUAWEI-SMARTLINK-MIB • HUAWEI-SNMP-EXT-MIB • HUAWEI-SSH-MIB • HUAWEI-STACK-MIB • HUAWEI-SWITCH-L2MAM-EXT-MIB • HUAWEI-SYS-CLOCK-MIB • HUAWEI-SYS-MAN-MIB • HUAWEI-TASK-MIB • HUAWEI-TCP-MIB • HUAWEI-TRNG-MIB • HUAWEI-VRRP-EXT-MIB • HUAWEI-XQOS-MIB

NOTE

For detailed information of MIB information, visit http://support.huawei.com/hedex/hdx.do?docid=EDOC1100020548&lang=en&idPath=7919710%7C21782165%7C21782239%7C22318540%7C7597815 or contact your local Huawei sales office.

Optical transceivers and Cables

Part	Product
40GE-QSFP+ Optical Transceivers	
QSFP-40G-SR-BD	40GBase-BD Optical Transceiver,QSFP+,40G,Multi-mode (850nm,0.1km,LC)
QSFP-40G-iSR4	40GBase-iSR4 Optical Transceiver, QSFP+, 40G, Multi-mode (850nm, 0.15km, MPO) (Connect to four SFP+ Optical Transceiver)
QSFP-40G-eSR4	40GBase-eSR4 Optical Transceiver, QSFP+, 40G, Multi-mode (850nm, 0.3km, MPO) (Connect to four SFP+ Optical Transceiver)
QSFP-40G-LX4	40GBase-LX4 Optical Transceiver, QSFP+, 40GE, Single-mode (1310nm, 2km, LC), Multi-mode(1310nm, 0.15km, LC)

Part	Product
QSFP-40G-eSM4	40GBase-eSM4 Optical Transceiver , QSFP+, 40G, Single-mode Module (1310nm, 10km, MPO) (Connect to four SFP+ Optical Transceiver)
QSFP-40G-LR4	40GBase-LR4 Optical Transceiver, QSFP+, 40GE, Single-mode Module (1310nm, 10km, LC)
QSFP-40G-LR4-Lite	QSFP-40G-LR4-Lite,40GBase-LR4 Lite Optical Transceiver,QSFP+,40G,Single-mode Module(1310nm,2km,LC)
QSFP-40G-ER4	40GBase-ER4 Optical Transceiver, QSFP+, 40G, Single-mode Module (1310nm, 40km, LC)
QSFP-40G-SDLC-PAM	40GBase-SDLC Optical Transceiver, QSFP+, 40G, Multi-mode (850nm, PAM4, 0.1km, LC)
QSFP-40G-eSDLC-PAM	40GBase-eSDLC Optical Transceiver, QSFP+, 40G, Multi-mode (850nm, PAM4, 0.3km, LC)
AOC High-Speed Cables	
QSFP-H40G-AOC10M	Optical transceiver, QSFP+, 40G, (850nm, 10m, AOC)
QSFP-4SFP10-AOC10M	Optical transceiver, QSFP+, 40G, (850nm, 10m, AOC)(Connect to four SFP+ Optical Transceiver)
Copper Cable	
QSFP-40G-CU1M	QSFP+,40G,High Speed Direct-attach Cables,1m,QSFP+38M,CC8P0.254B(S),QSFP+38M,Used indoor
QSFP-40G-CU3M	QSFP+,40G,High Speed Direct-attach Cables,3m,QSFP+38M,CC8P0.32B(S),QSFP+38M,Used indoor
QSFP-40G-CU5M	QSFP+,40G,High Speed Direct-attach Cables,5m,QSFP+38M,CC8P0.40B(S),QSFP+38M,Used indoor
QSFP-4SFP10G-CU1M	QSFP+,4SFP+10G,High Speed Direct-attach Cables,1m,QSFP+38M,CC8P0.254B(S),4*SFP+20M,Used indoor
QSFP-4SFP10G-CU3M	QSFP+,4SFP+10G,High Speed Direct-attach Cables,3m,QSFP+38M,CC8P0.32B(S),4*SFP+20M,Used indoor

Ordering Information

Mainframe	
CE5880-EI-B-B00	CE5880-48T6Q-EI Switch spare part(44*GE RJ45, 4*10GE RJ45, 6*40GE QSFP+, 2*AC power modules, 2*fan modules, port-side intake)
CE5880-EI-F-B00	CE5880-48T6Q-EI switch (44*GE RJ45, 4*10GE RJ45, 6*40GE QSFP+, 2*AC power modules, 2*fan modules, port-side exhaust)
CE5880-48T6Q-EI	CE5880-48T6Q-EI switch (44*GE RJ45, 4*10GE RJ45, 6*40GE QSFP+, without fan and power modules)

Fan Tray		
Model	**Description**	**Applicable Product**
PAC-600WA-F	600W AC Power Module (Front to Back, Power panel side intake)	CE5880-48T6Q-EI
PAC-600WA-B	600W AC Power Module (Back to Front, Power panel side exhaust)	CE5880-48T6Q-EI

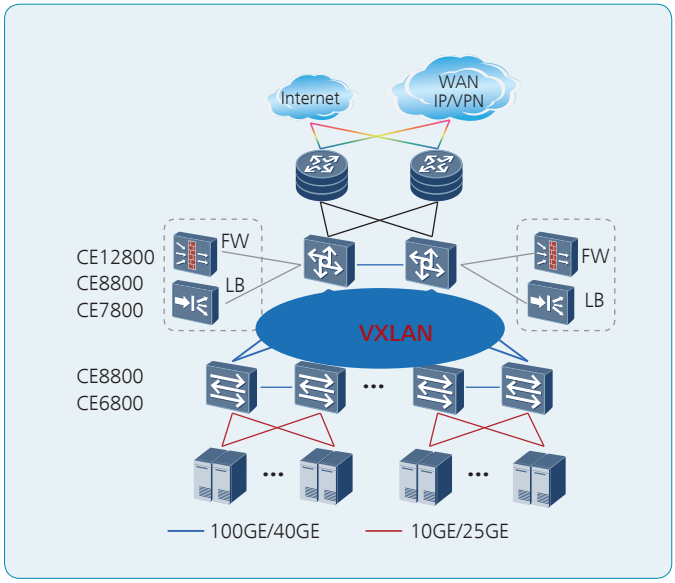
Software	
CE58-LIC-VXLAN	CloudEngine 5800 VXLAN Function
CE58-LIC-NSH	CloudEngine 5800 NSH Function
CE58-LIC-TLM	CloudEngine 5800 Telemetry Function
N1-CE58LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 5800
N1-CE58CFFD-SYS1Y	N1-CloudFabric Foundation SW License for CloudEngine 5800-SnS-1 Year

Networking and Application

Data Center Applications

On a typical data center network, CE5880 switches work as TOR switches and connect to CE12800, CE8800, or CE7800 core switches using 40GE/100GE ports, building an end-to-end 100GE full-mesh network. The core and TOR switches use fabric technologies such as VXLAN to build a non-blocking large Layer 2 network, which allows for large-scale VM migration and flexible service deployment.

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



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