CloudEngine 5800 Series Data Center Switches

HUAWEI TECHNOLOGIES CO., LTD.

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Product Overview

Huawei CloudEngine 5800 series (CE5800 for short) switches are next-generation, high-density Gigabit Ethernet switches designed for data centers and high-end campus networks. The CE5800 hardware has an advanced architectural design with the industry's highest density of GE access ports. The CE5800 is also the first Gigabit Ethernet access switch to provide 40GE uplink ports. Using the Huawei VRP8 software platform, CE5800 switches support Transparent Interconnection of Lots of Links (TRILL) and have a high stacking capability (up to 16-member switches in a stack system). In addition, the airflow direction (front-to-back or back-to-front) can be changed. CE5800 switches can work with CE12800 switches to build an elastic, virtualized, high-quality fabric that meets the requirements of cloud-computing data centers. CE5800 switches provide high-density GE access to help enterprises build a scalable data center network platform for cloud computing. They can also be used as aggregation or access switches for enterprise campus networks.

Product Appearance

The CE5800 comes in three models.

CE5855-48T4S2Q-EI

48*GE BASE-T ports, 4*10GE SFP+ ports, 2*40GE QSFP+ ports

CE5855-24T4S2Q-EI

24*GE BASE-T ports, 4*10GE SFP+ ports, 2*40GE QSFP+ ports

CE5850-48T4S2Q-HI

48*GE BASE-T ports, 4*10GE SFP+ ports, 2*40GE QSFP+ ports

Product Characteristics

High-density GE Access

- Each CE5800 switch provides 48*GE line-speed ports, which makes future data center expansion easy.
- The CE5850 is the first GE access switch to provide 40GE uplink ports. CE5850 switches can work with CE12800 switches to build a high-performance data center network that provides 40GE access. The two 40GE uplink ports on CE5850 back up each other to improve system reliability.

Highly Reliable, High-Performance Stacking

- The industry's first 16-member stack system
  - » A stack system of 16 member switches has up to 768*GE access ports for high-density server access in a data center.
  - » Multiple stacked switches 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 points of failure and greatly improves system reliability.
- Long-distance, highly reliable stacking
  - » CE5800 switches can use either 10GE or 40GE ports as stack ports. A stack system can be established with switches in the same rack or different racks, and even over long distances.
  - » The 40GE ports of the CE5850 can set up large-capacity stack channels that enable multiple CE5800 switches to constitute a non-blocking stack system.

Vertical Virtualization Simplifies Management

- The CE5800 supports Super Virtual Fabric (SVF), which can virtualize multiple physical switches of the same or different types into one logical switch to simplify network management and improve reliability.
- SVF virtualizes multiple leaf switches into remote cards of the spine switch, making it easier to connect cables and manage devices in equipment rooms. The CE5800 switches act as leaf switches in an SVF system.
- Huawei's SVF is the first in the industry to implement local forwarding on leaf switches. When horizontal traffic dominates in a data center, SVF improves the forwarding efficiency and reduces network delay.

Large-Scale Routing Bridge, On-Demand Scaling

- The CE5850 supports the TRILL protocol and can be used on a large Layer 2 TRILL network with GE/10GE servers. A TRILL network can contain more than 500 nodes, enabling flexible service deployments and large-scale Virtual Machine (VM) migrations.
- The TRILL protocol uses a routing mechanism similar to IS-IS and sets a limited time to live (TTL) value in packets to prevent Layer 2 loops. This significantly improves network stability and speeds up network convergence.
- On a TRILL network, all data flows are forwarded quickly using Shortest Path First (SPF) and Equal-cost Multi-path (ECMP) routing. SPF and ECMP avoid the suboptimal path selection problem in STP and increase link bandwidth efficiency to 100 percent.
- The CE5850 supports up to 16 TRILL-based Layer 2 equal-cost paths, greatly improving links' load balancing capabilities. The network has a fat-tree architecture that enhances expansion.

Programmable Network Device, Flexible Customization

- The CE5800 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 OPS provides seamless integration of data center service and network in addition to a service-oriented, software-defined networking (SDN).

Zero Touch Provisioning, Automatic O&M

- The CE5800 supports Zero Touch Provisioning (ZTP). ZTP enables the CE5800 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 CE5800 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 CE5800 has energy-saving chips and can measure system power consumption in real time. Fan speeds 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 the port status.
  - » State and stack indicators on both the front and rear panels enable operators to maintain the switch from either side.
  - » CE5800 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[1]

Item	CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Device virtualization	iStack[2]		
	Super Virtual Fabric (SVF)[3] (Only supported by CE 5855)		
	M-LAG		
Network virtualization	TRILL		
Programmability	Open Programmability System (OPS)		
Traffic analysis	NetStream		
	sFlow		
VLAN	Adding access, trunk, and hybrid interfaces to VLANs		
	Default VLAN		
	QinQ		
	MUX VLAN		
	GVRP		
MAC address table	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		
IP routing	IPv4 routing protocols, such as RIP, OSPF, BGP, and IS-IS		
	IPv6 routing protocols, such as RIPng, OSPFv3, IS-ISv6, and BGP4+		
IPv6	IPv6 Neighbor Discovery (ND)		
	Path MTU Discovery (PMTU)		
	TCP6, ping IPv6, tracert IPv6, socket IPv6, UDP6, and Raw IP6		
Multicast	IGMP, PIM-SM, PIM-DM, MSDP, and MBGP		
	IGMP snooping		
	Fast leaving of multicast member interfaces		
	Multicast traffic suppression		
	Multicast VLAN		

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
3 For details about the configuration, please see: http://support.huawei.com/onlinetoolsweb/virtual/en/dc/svf_index.html?dcb

Item	CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Reliability	LACP		
	STP, RSTP, VBST, MSTP		
	BPDU protection, root protection, and loop protection		
	Smart Link and multi-instance		
	DLDP		
	ERPS (G.8032)		
	VRRP, VRRP load balancing, and BFD for VRRP		
	BFD for BGP/IS-IS/OSPF/Static route		
QoS	Traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p 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		
	Traffic shaping		
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		
	802.3az Energy Efficient Ethernet (EEE)		
	Hot patches		
	User operation logs		
	Zero Touch Provisioning (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)		

Performance and Scalability

Item	CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Maximum number of MAC address entries	32K	32K	128K
Maximum number of Forwarding routes (FIB IPv4/ IPv6)	32K/18K	32K/18K	16K/8K
ARP table size	54K	54K	20K
Maximum number of VRF	1024		
IPv6 ND(Neighbour Discovery) table size	16K	16K	4K
Maximum Number of multicast routes (Multicast FIB IPv4/IPv6)	8K/NA	8K/NA	8K/2K
Maximum VRRP groups	128		
Maximum number of ECMP paths	32		
Maximum ACL number	Ingress: 9000/ Egress: 2000	Ingress: 4500/ Egress: 1000	Ingress: 2250/ Egress: 1000
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		
VBST (Maximum number of VLANs where VBST can be configured)	500		

NOTE

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

Hardware Specifications

Item			CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Physical Features		Dimensions (W × D × H ,mm)	442 mm x 420 mm x 43.6 mm		
		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(Gbps)	336	288	336
		Forwarding performance(mpps)	252	215	252
Number of GE Base-T ports			48	24	48
Number of 10GE SFP+ ports			4	4	4
40GE QSFP+ ports			2	2	2
Card		Number of card slot	0		
		Card type	Fixed Switch		
Management interface		Out-of-band management port	1*GE management interface		
		Console port	1*RJ45 interface		
		USB port	1		
CPU		Main frequency(HZ)	1G	1G	1.2G
		Number of cores	2		
Storage		RAM	2GB		
		NOR Flash	16MB	16MB	16MB
		NAND Flash	512MB	512MB	1GB
System		System buffer	8MB	4MB	9MB

Item		CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Power Supply System	Power modules	600 W AC/350 W –48V DC		
	Rated voltage range(V)	100 V to 240 V AC –48 V to –60 V DC		
	Maximum voltage range(V)	90 ~ 264 AC –38.4 V to –72 V DC	90 ~ 264 AC –38.4 V to –72 V DC	90 ~ 290 AC –38.4 V to –72 V DC
	Maximum input current	100-240V 3A -48 – -60V DC 11A	100-240V 3A -48 – -60V DC 11A	100-240V 2.5A -48 – -60V DC 11A
	Typical power	76W(100% traffic load, copper cable, normal temperature, dual power modules) 81W(100% traffic load, short-distance optical modules, normal temperature, dual power modules)	48W(100% traffic load, copper cable, normal temperature, dual power modules) 53W(100% traffic load, short-distance optical modules, normal temperature, dual power modules)	109W
	Maximum power	103W	75W	131W
	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)	315	256	447

Item		CE5855-48T4S2Q-EI	CE5855-24T4S2Q-EI	CE5850-48T4S2Q-HI
Environment specifications	Long-term operating temperature(℃)	0 to 40℃(0-1800m) The temperature decreases by 1℃ each time the altitude increases by 220 m.		
	Storage temperature(℃)	-40 to +70℃		
	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: < 58	Front-to-back airflow: < 62 Back-to-front airflow: < 58	Front-to-back airflow: < 64 Back-to-front airflow: < 58
	Sound power at 40° C (dBA)	Front-to-back airflow: < 76 Back-to-front airflow: < 71	Front-to-back airflow: < 72 Back-to-front airflow: < 71	Front-to-back airflow: < 80 Back-to-front airflow: < 78
	Sound pressure at 27° C (dBA)	Front-to-back airflow: 49 in average (maximum: 55) Back-to-front airflow: 42 in average (maximum: 48)	Front-to-back airflow: 46 in average (maximum: 51) Back-to-front airflow: 42 in average (maximum: 48)	Front-to-back airflow: 49 in average (maximum: 51) Back-to-front airflow: 43 in average (maximum: 45)
	Surge protection	AC power supply protection: 6 kV in common mode and 6 kV in differential mode DC power supply protection: 4 kV in common mode and 2 kV in differential mode		
Reliability	MTBF (year)	55.08	65.62	58.96
	MTTR (hour)	1.81	1.77	2.0
	Availability	0.99999625521	0.99999690870	0.9999961280

NOTE

For detailed information of CloudEngine 5800 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 5800 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

Optical transceivers and Cables

Part Number	Product Description
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)
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

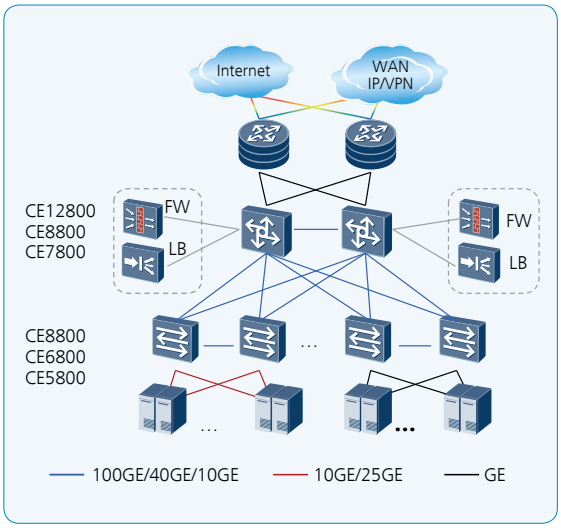
Mainframe		
CE5850-HI-B00	CE5850-48T4S2Q-HI Switch (2*150W AC Power Module, 2*FAN Box, Port side exhaust)	
CE5855-48T4S2Q-EI	CE5855-48T4S2Q-EI Switch (48-Port GE RJ45,4-Port 10GE SFP+,2-Port 40G QSFP+, Without Fan and Power Module)	
CE5855-24T4S2Q-EI	CE5855-24T4S2Q-EI Switch (24-Port GE RJ45,4-Port 10GE SFP+,2-Port 40G QSFP+, Without Fan and Power Module)	
CE5850-48T4S2Q-HI	CE5850-48T4S2Q-HI Switch (48-Port GE RJ45,4-Port 10GE SFP+,2-Port 40G QSFP+, Without Fan and Power Module)	
Fan box		
Part Number	Product Description	Support Product
FAN-40EA-F	Fan box (EA, Front to Back, FAN panel side intake)	CE5850-48T4S2Q-HI
FAN-40EA-B	Fan box (EA, Back to Front, FAN panel side exhaust)	CE5850-48T4S2Q-HI
FAN-040A-F	Fan box(F,FAN panel side exhaust)	CE5855-48T4S2Q-EI CE5855-24T4S2Q-EI
FAN-040A-B	Fan box(B,FAN panel side exhaust)	CE5855-48T4S2Q-EI CE5855-24T4S2Q-EI
Power		
Part Number	Product Description	Support Product
PAC-150WA	150W AC Power Module (No Fan)	CE5850-48T4S2Q-HI
ES0W2PSA0150	150W AC Power Module(Black)	CE5855-48T4S2Q-EI, CE5855-24T4S2Q-EI
PDC-350WA-F	350W DC Power Module (Front to Back, Power panel side intake)	CE5850-48T4S2Q-HI, CE5855-48T4S2Q-EI, CE5855-24T4S2Q-EI
PDC-350WA-B	350W DC Power Module (Back to Front, Power panel side exhaust)	CE5850-48T4S2Q-HI, CE5855-48T4S2Q-EI, CE5855-24T4S2Q-EI

Networking and Application

Data Center Applications

On a typical data center network, CE12800/CE8800/CE7800 switches work as core switches, whereas CE8800/CE6800/CE5800 switches work as ToR switches and connect to the core switches using 100GE/40GE/10GE ports. These switches use a fabric protocol, such as CSS or M-LAG, to establish a non-blocking large Layer 2 network, which allows large-scale VM migrations and flexible service deployments.

Note: CSS and M-LAG can be also used on campus networks to support flexible service deployments in different service areas.

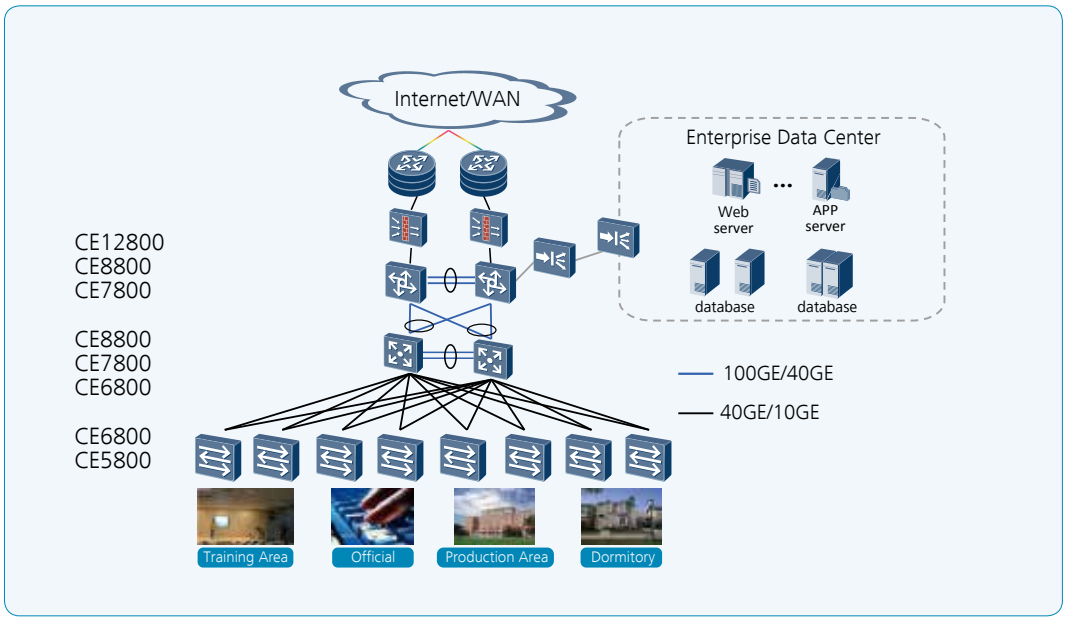


Campus Network Applications

CE5800 switches can be used as aggregation or access switches on a campus network. Their high-density, line-speed GE ports, unique 40GE uplink ports, and high stacking capabilities can meet the ever-increasing demand for network bandwidth. CE5800 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 CloudFabric technology, such as SVF or M-LAG (vertical virtualization), to provide high-density line-rate ports.

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



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