

CloudEngine 6800 Series Data Center Switches



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Product Overview

Huawei CloudEngine 6800 (CE6800) series switches are next-generation 10G Ethernet switches designed for data centers and high-end campus networks. The switches provide high-performance, high-density 10GE ports, and low latency. The CE6800 hardware has an advanced architectural design with 40GE uplink ports and the industry's highest density of 10GE access ports. Using the Huawei VRP8 software platform, CE6800 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. CE6800 switches can work with CE12800 switches to build an elastic, virtualized, high-quality fabric that meets the requirements of cloud-computing data centers.

CE6800 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

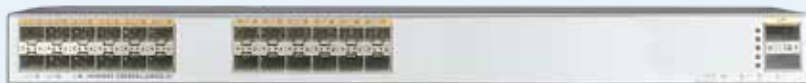
The CE6800 comes in twelve models.

CE6850U-48S6Q-HI



48*10GE SFP+ ports, or 2/4/8G FC ports, 6*40GE QSFP+ ports

CE6850U-24S2Q-HI



24*10GE SFP+ ports, or 2/4/8G FC ports, 2*40GE QSFP+ ports

CE6851-48S6Q-HI



48*10GE SFP+ ports, 6*40GE QSFP+ ports

CE6850-48T6Q-HI



48*10GEBASE-T ports, 6*40GE QSFP+ports

CE6850-48S6Q-HI



48*10GE SFP+ ports, 6*40GE QSFP+ ports

CE6850-48T4Q-EI



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

CE6850-48S4Q-EI



48*10GE SFP+ ports, 4*40GE QSFP+ ports

CE6810-48S4Q-EI



48*10GE SFP+ ports, 4*40GE QSFP+ ports

CE6810-48S4Q-LI



48*10GE SFP+ ports, 4*40GE QSFP+ ports

CE6810-32T16S4Q-LI



32*10GE BASE-T ports, 16*10GE SFP+ ports, 4*40GE QSFP+ ports

CE6810-48S-LI



48*10GE SFP+ ports

CE6810-24S2Q-LI



24*10GE SFP+ ports, 2*40GE QSFP+ ports

Product Characteristics

High-Density 10GE Access

- The CE6800 provides the industry's highest performance in a 1 U TOR. The switch provides forwarding performance of 1,080 Mpps and supports L2/L3 line-speed forwarding.
- The CE6800 provides the industry's highest 10GE port density in a 1 U TOR with a maximum of 72*10GE ports, meeting the requirements for high-density 10GE server access. In addition, four 10GE optical ports that have consecutive numbers can be aggregated into one 40GE port, which improves networking flexibility while lowering customer Total Cost of Ownership (TCO).
- The CE6800 has a maximum of six 40GE QSFP+ ports. Each QSFP+ port can be used as four 10GE SFP+ ports, providing a flexible network. CE6800 switches can work with CE12800 switches through the 40GE QSFP+ ports 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, highly reliable stacking
 - » The CE6800 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's scale so that network resources can be used more efficiently.

Vertical Virtualization Simplifies Management

- The CE6800 supports Super Virtual Fabric (SVF), which can virtualize multiple homogeneous or heterogeneous physical switches into one logical switch to simplify network management and improve reliability.
- SVF implements vertical extension of heterogeneous switches and virtualizes multiple leaf switches into remote cards of the spine switch, making it easier to install cables in equipment rooms and manage devices. The CE6850 functions as the spine switch and the CE6810 as the leaf switch.
 - » Huawei's SVF is the first in the industry to implement local forwarding of leaf switches. When horizontal traffic is the mainstream traffic in a data center, SVF improves forwarding efficiency and reduces network delay.

Large-Scale Routing Bridge, On-Demand Scaling

- The CE6800 supports the IETF Transparent Interconnection of Lots of Links (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 CE6800 supports TRILL-based Layer 2 equal-cost paths, greatly improving links' load balancing capabilities. The network has a fat-tree architecture that enhances expansion.

Virtualized Gateway Achieves Fast Service Deployment

- The CE6800 can work with a mainstream virtualization platform. As the high-performance, hardware gateway of an overlay network (VXLAN), the CE6800 can support more than 16M tenants.
- The CE6800 can connect to a cloud platform through an open API to provide unified management of software and hardware networks.
- This function implements fast service deployment without changing the customer network. It also protects customer investments.

Converged Enhanced Ethernet, Data, Storage, and Computing Traffic over One Network

- CE6800 series switches support Fibre Channel over Ethernet (FCoE), which permits storage, data, and computing services to be transmitted on one network, reducing the costs of network construction and maintenance.
- CE6800 series switches support centralized FCoE/FC gateway deployment, which makes network O&M simpler.
- Various CE6800 features ensure lossless transmission: Priority-based Flow Control (PFC), Enhanced Transmission Selection (ETS) and Data Center Bridging eXchange (DCBX). These features ensure low latency and zero packet loss for FC storage and high-speed computing services.

Fast VM Migration, Policy Mobility

- The CE6800 works with Huawei's Agile Controller to permit network policies to be dynamically deployed on the CE6800. Agile Controller also supports online VM migration.
- Agile Controller delivers network policies through high-speed RADIUS interfaces. Its online VM migration is 10 to 20 times the rate of other industry platforms, enabling large-scale VM migrations.
- Agile Controller is based on open APIs and is compatible with all major virtualization platforms including VMware.

Programmable Network Device, Flexible Customization

- The CE6800 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 Network (SDN).

Zero-Configuration Deployment, Automatic O&M

- The CE6800 supports Zero Touch Provisioning (ZTP). ZTP enables the CE6800 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 Saves Energy

- Flexible front-to-back/back-to-front airflow design
 - » The CE6800 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 technologies
 - » The CE6800 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 40GE port indicators can show the state of all the 10GE ports derived from the 40GE ports.
 - » State and stack indicators on both the front and rear panels enable operators to maintain the switch from either side.
 - » CE6800 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	CE6850U		CE6850					CE6810				
	CE6850U-48S6Q-HI	CE6850U-24S2Q-HI	CE6851-48S6Q-HI	CE6850-48T6Q-HI	CE6850-48S6Q-HI	CE6850-48T4Q-EI	CE6850-48S4Q-EI	CE6810-48S4Q-EI	CE6810-48S4Q-LI	CE6810-32T16S4Q-LI	CE6810-48S-LI	CE6810-24S2Q-LI
10G BASE-T port	0	0	0	48	0	48	0	0	0	32	0	0
SFP+ port	48	24	48	0	48	0	48	48	48	16	48	24
FC port	48	24	0	0	0	0	0	0	0	0	0	0
QSFP+ port	6	2	6	6	6	4	4	4	4	4	0	2
Switching capacity	1.44 Tbit/s	640 Gbit/s	1.44 Tbit/s	1.44 Tbit/s	1.44 Tbit/s	1.28 Tbit/s	1.28 Tbit/s	1.28 Tbit/s	1.28 Tbit/s	1.28 Tbit/s	960 Gbit/s	640 Gbit/s
Forwarding performance	1080 Mpps	480 Mpps	1080 Mpps	1080 Mpps	1,080 Mpps	960 Mpps	960 Mpps	960 Mpps	960 Mpps	960 Mpps	720 Mpps	480 Mpps
Airflow design	Front-to-back or back-to-front											

Item	CE6850U		CE6850				CE6810					
	CE6850U-4856Q-HI	CE6850U-2452Q-HI	CE6851-4856Q-HI	CE6850-48T6Q-HI	CE6850-48S6Q-HI	CE6850-48T4Q-EI	CE6850-48S4Q-EI	CE6810-48S4Q-EI	CE6810-48S4Q-LI	CE6810-32T16S4Q-LI	CE6810-48S-LI	CE6810-2452Q-LI
Device virtualization	iStack											
	Super Virtual Fabric (SVF)											
Network virtualization	M-LAG											
	TRILL (CE6800HI & CE6800EI)											
	VXLAN (Virtual Extensible LAN) routing and bridging (CE6800HI)											
	EVPN											
VM awareness	Agile Controller											
Network convergence	FCoE											
	DCBX, PFC, and ETS											
Programmability	OpenFlow											
	OPS											
	Puppet, and OVSDB plugins released on open source websites											
	Linux container for open source and customization programming											
VLAN	Adding access, trunk, and hybrid interfaces to VLANs											
	Default VLAN											
	QinQ											
	MUX VLAN											
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, tracer IPv6, socket IPv6, UDP6, and Raw IP6											
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	MPLS (CE6800HI)											

Item	CE6850U		CE6850				CE6810					
	CE6850U-4856Q-HI	CE6850U-2452Q-HI	CE6851-4856Q-HI	CE6850-48T6Q-HI	CE6850-48S6Q-HI	CE6850-48T4Q-EI	CE6850-48S4Q-EI	CE6810-48S4Q-EI	CE6810-48S4Q-LI	CE6810-32T16S4Q-LI	CE6810-48S-LI	CE6810-2452Q-LI
Reliability	LACP											
	STP, RSTP, VBST, and 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											
	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)											

Item	CE6850U		CE6850					CE6810				
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Dimensions (W x D x H)	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 420 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 420 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm	442 mm x 600 mm x 43.6 mm
Weight (fully loaded)	12.6 kg	12 kg	12 kg	12.6 kg	11.6 kg	11 kg	11 kg	10 kg	10.4 Kg	8.5kg	10.2 Kg	10 kg
Environmental parameters	Operating temperature: 0°C to 40°C (0 m to 1,800 m) Storage temperature: -40°C to +70°C Relative humidity: 5% RH to 95% RH, non-condensing											
Operating voltage	AC: 220V DC: 240V & 380V VDC	AC: 220V DC: 240V & 380V VDC	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 220V DC: 240V & 380V VDC	AC: 220V DC: 240V & 380V VDC	AC: 90 V to 290 V	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 90 V to 290 V DC: -38.4V to -72V	AC: 90 V to 290 V DC: -38.4V to -72V
Maximum power consumption	≤307 W	≤ 2 6 0 W	≤260 W	≤ 3 4 5 W	≤ 272 W	≤ 380 W	≤ 272 W	≤ 238 W	≤238 W	≤ 2 7 0 W	≤ 1 7 8 W	≤ 2 1 0 W

Ordering Information

Mainframe	
CE6850-HI-B00	CE6850-48S6Q-HI Switch (2*600W AC Power Module, 2*FAN Box, Port Side Exhaust)
CE6850-EI-B00	CE6850-48S4Q-EI Switch (2*350W AC Power Module, 2*FAN Box, Port side exhaust)
CE6850-EI-B01	CE6850-48T4Q-EI Switch (2*600W AC Power Module, 2*FAN Box, Port side exhaust)
CE6810-EI-B00	CE6810-48S4Q-EI Switch (2*600W AC Power Module, 2*FAN Box, Port side exhaust)
CE6810-LI-B00	CE6810-48S4Q-LI Switch (2*600W AC Power Module, 2*FAN Box, Port side exhaust)
CE6810-LI-B01	CE6810-48S-LI Switch (2*600W AC Power Module, 2*FAN Box, Port side exhaust)
CE6810-LI-B10	CE6810-LI Bundle 10 (CE6810-48S4Q-LI mainframe, 4*QSFP-40G-iSR4, Without Fan and Power Module)
CE6810-LI-B11	CE6810-LI Bundle 11 (CE6810-48S-LI mainframe, 2*QSFP-40G-iSR4, 8*SFP-10G-USR, Without Fan and Power Module)
CE6850U-48S6Q-HI	CE6850U-48S6Q-HI Switch (48-Port 10GE SFP+, support 2/4/8G FC, 6-Port 40GE QSFP+, Without Fan and Power Module)
CE6850U-24S2Q-HI	CE6850U-24S2Q-HI Switch (24-Port 10GE SFP+, support 2/4/8G FC, 2-Port 40GE QSFP+, Without Fan and Power Module)
CE6851-48S6Q-HI	CE6851-48S6Q-HI Switch (48-Port 10GE SFP+, 6-Port 40GE QSFP+, Without Fan and Power Module)
CE6850-48T6Q-HI	CE6850-48T 6Q-HI Switch (48-Port 10GE RJ45, 6-Port 40GE QSFP+, Without Fan and Power Module)

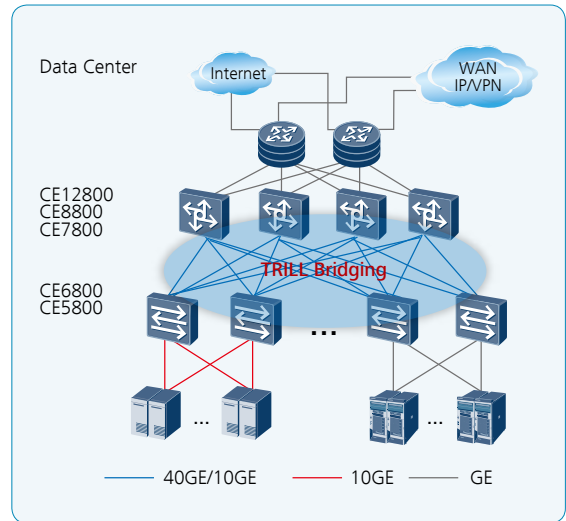
CE6850-48S6Q-HI	CE6850-48S6Q-HI Switch (48-Port 10GE SFP+, 6-Port 40GE QSFP+, Without Fan and Power Module)
CE6850-48S4Q-EI	CE6850-48S4Q-EI Switch (48-Port 10GE SFP+, 4-Port 40G QSFP+, Without Fan and Power Module)
CE6850-48T4Q-EI	CE6850-48T4Q-EI Switch (48-port 10GE RJ45, 4-port 40G QSFP+, Without Fan and Power Module)
CE6810-48S4Q-EI	CE6810-48S4Q-EI Switch (48-Port 10GE SFP+, 4-Port 40G QSFP+, Without Fan and Power Module)
CE6810-48S4Q-LI	CE6810-48S4Q-LI Switch (48-Port 10GE SFP+, 4-Port 40G QSFP+, Without Fan and Power Module)
CE6810-32T16S4Q-LI	CE6810-32T16S4Q-LI Switch (32-port 10GE RJ45, 16-Port 10GE SFP+, 4-Port 40G QSFP+, Without Fan and Power Module)
CE6810-48S-LI	CE6810-48S-LI Switch (48-Port 10GE SFP+, Without Fan and Power Module)
CE6810-24S2Q-LI	CE6810-24S2Q-LI Switch (24-Port 10GE SFP+, 2-Port 40G QSFP+, Without Fan and Power Module)
Fan box	
FAN-060A-F	Fan box (F, FAN panel side intake)
FAN-060A-B	Fan box (B, FAN panel side exhaust)
FAN-40EA-F	Fan box (EA, Front to Back, FAN panel side intake)
FAN-40EA-B	Fan box (EA, Back to Front, FAN panel side exhaust)
Power	
PAC-600WB-F	600W AC&240V DC Power Module (Power panel side intake)
PAC-600WB-B	600W AC&240V DC Power Module (Power panel side exhaust)
PHD-600WA-F	600W HVDC Power Module (Power panel side intake)
PHD-600WA-B	600W HVDC Power Module (Power panel side exhaust)
PAC-350WA-F	350W AC Power Module (Front to Back, Power panel side intake)
PAC-350WA-B	350W AC Power Module (Back to Front, Power panel side exhaust)
PAC-600WA-F	600W AC Power Module (Front to Back, Power panel side intake)
PAC-600WA-B	600W AC Power Module (Back to Front, Power panel side exhaust)
PDC-350WA-F	350W DC Power Module (Front to Back, Power panel side intake)
PDC-350WA-B	350W DC Power Module (Back to Front, Power panel side exhaust)
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

Networking and Application

Data Center Applications

CE12800/CE8800/CE7800 switches work as core switches and CE6800/CE5800 switches work as TOR switches on a typical data center network. CE6800/CE5800 switches connect to CE12800/CE8800/CE7800 switches through 40GE/10GE ports. The CE12800/CE8800/CE7800 and CE6800/CE5800 switches use the TRILL protocol to build a non-blocking Layer 2 network, which allows large-scale VM migrations and flexible service deployments.

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

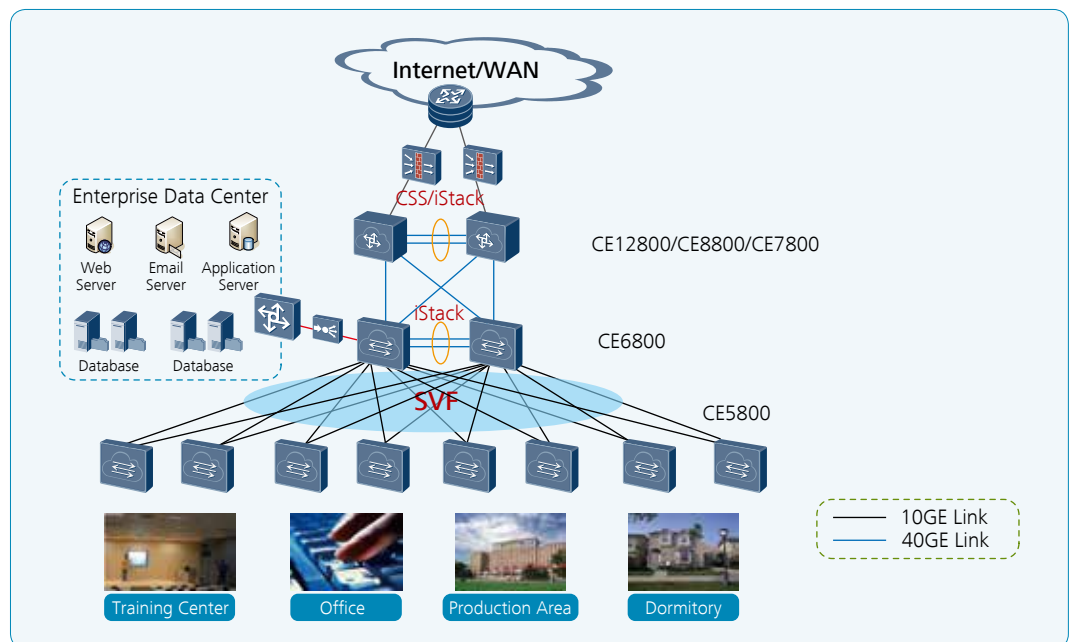


Campus Network Applications

CE6800 switches can be used as aggregation or core switches on a campus network. Their high-density, line-speed 10GE ports and high stacking capability can meet the ever-increasing demand for network bandwidth. CE6800 switches are cost-effective campus network switches, thanks to their extensive service features and innovative energy-saving technologies.

On a typical campus network, two CE12800/CE8800/CE7800 switches are virtualized into a logical core switch using CSS or iStack technology. Multiple 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, CE5800 switches are virtualized with SVF to provide high-density line-speed ports.

Note: iStack technology is also widely used in data centers to facilitate network management.



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