

# CloudEngine 7800 Series Data Center Switches



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## Product Overview

Huawei CloudEngine 7800 series (CE7800) switches are next-generation 40G Ethernet switches designed for data centers and high-end campus networks. The switches provide high-performance, high-density 40GE ports, and low latency. The CE7800 hardware has an advanced architectural design with 40GE QSFP+ ports. Using the Huawei VRP8 software platform, CE7800 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. CE7800 switches can work with CE12800/CE8800/CE6800/CE5800 switches to build an elastic, virtualized, high-quality fabric that meets the requirements of cloud-computing data centers.

CE7800 switches can function as core or aggregation switches on data center networks 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 CE7800 comes in one model.

### CE7850-32Q-EI



32\*40GE QSFP+ ports

## Product Characteristics

### High-density 40GE Access

- The CE7800 provides 2.56 Tbit/s switching capacity in a 1 U TOR, forwarding performance of 1,440 Mpps, and supports L2/L3 line-speed forwarding.
- The CE7800 provides a maximum of 32\*40GE QSFP+ ports, and can function as the core or aggregation switch on a data center or campus network.
- The QSFP+ port can be used as four 10GE SFP+ ports, providing a flexible network. CE7800 switches can work with CE12800/6800/5800 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 512\*40GE 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 CE7800 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 CE7800 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 CE7800 functions as the spine 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 Scalability

- The CE7800 supports the IETF Transparent Interconnection of Lots of Links (TRILL) protocol. 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 CE7800 supports TRILL-based Layer 2 equal-cost paths, greatly improving links' load balancing capabilities. The network has a fat-tree architecture that enhances expansion.

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

- The CE7800 supports 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.
- The CE7800 supports centralized FCoE/FC gateway deployment, which makes network O&M simpler.
- Various CE7800 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 CE7800 works with Huawei's Agile Controller to permit network policies to be dynamically deployed on the CE7800. 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 CE7800 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).

### Virtualized Gateway Achieves Fast Service Deployment

- The CE7800 can work with a mainstream virtualization platform. As the high-performance, hardware gateway of an overlay network (VXLAN), the CE7800 can support more than 16M tenants.

- The CE7800 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.

### Zero-Configuration Deployment, Automatic O&M

- The CE7800 supports Zero Touch Provisioning (ZTP). ZTP enables the CE7800 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 CE7800 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.
- Innovative energy-saving technologies
  - » The CE7800 has 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.
  - » The CE7800 supports 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	CE7850-32Q-EI
Ports	32 *40GE QSFP+
Switching capacity	2.56 Tbit/s
Forwarding performance	1,440 Mpps
Airflow design	Front-to-back or back-to-front
Device virtualization	iStack
	SVF
Network virtualization	M-LAG
	TRILL
	VXLAN routing and bridging
	EVPN

Item	CE7850-32Q-EI
VM-awareness	Agile Controller
Network convergence	FCoE
	DCBX, PFC, ETS
Programmability	OpenFlow
	OPS
	Puppet, and OVSDDB plugins released on open source websites
	Linux container for open source and customization programming
Traffic analysis	NetStream
	sFlow
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
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

Item	CE7850-32Q-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
	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 and VLAN
	Authentication methods, including AAA, RADIUS, and HWTACACS
Remote Network Monitoring (RMON)	
Dimensions (W x D x H)	442 mm x 607 mm x 43.6 mm
Weight (fully loaded)	11 kg
Environment 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: 90 V to 290 V
Maximum power consumption	≤ 431 W

## Ordering Information

### Mainframe

CE7850-EI-B00	CE7850-32Q-EI Switch(2*600W AC Power Module,2*FAN Box, Port side exhaust)
CE7850-32Q-EI	CE7850-32Q-EI Switch(32-Port 40GE QSFP+, Without Fan and Power Module)

### Fan box

FAN-40HA-F	Fan box(HA, Front to Back, FAN panel side intake)
FAN-40HA-B	Fan box(HA, Back to Front, FAN panel side exhaust)

### Power

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)

### Software

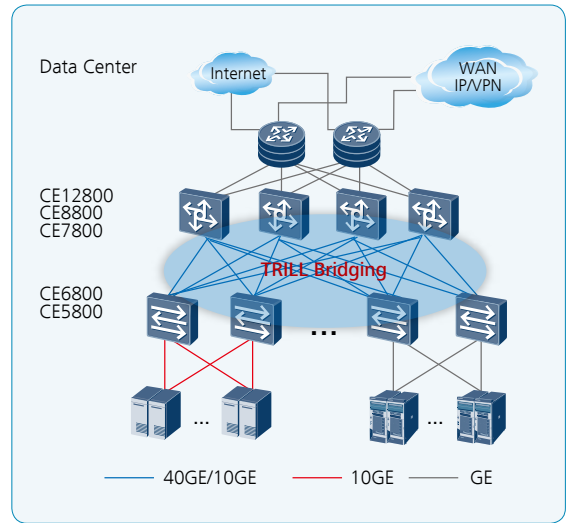
CE-LIC-VXLAN	VXLAN function
CE78-LIC-FCF16	CloudEngine 7800 FCF 16 Ports license
CE78-LIC-FCFAL	CloudEngine 7800 FCF All Ports
CE78-LIC-NPV	CloudEngine 7800 FCOE NPV Function

## Networking and Application

### Data Center Applications

On a typical data center network, CE12800/CE8800/CE7800 switches work as core switches and CE6800/CE5800 switches work as TOR switches. 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.

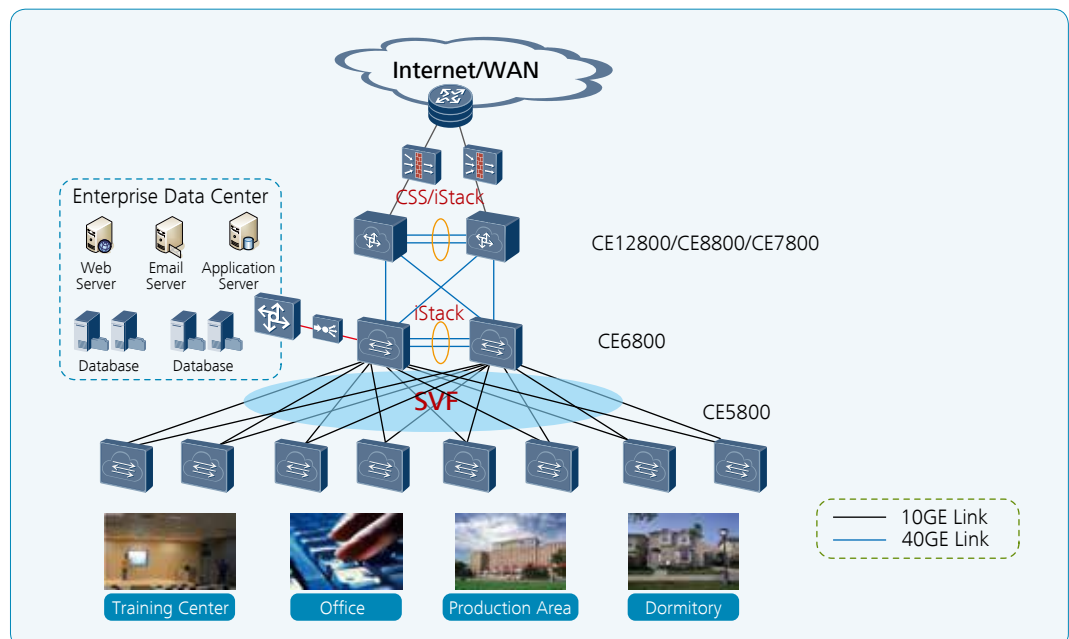


### Campus Network Applications

The CE7800 can be used on a campus network. Its high-density, line-speed 40GE ports and high stacking capability can meet the ever-increasing demand for network bandwidth. CE7800 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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