**CloudEngine 8800&7800&6800&5800 Series Switches**

**V200R001C00**

# Product Description

**Issue        03**

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# About This Document

## Intended Audience

This document describes the positioning, characteristics, usage scenarios, functions, system architecture, operations and maintenance, and specifications of CloudEngine (CE) switches.

This document helps you understand the characteristics and features of CE switches.

This document is intended for:

- Network planning engineers
- Hardware installation engineers
- Commissioning engineers
- Data configuration engineers
- Onsite maintenance engineers
- Network monitoring engineers
- System maintenance engineers

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol | Description |
|---|---|
| ⚠ DANGER | Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
| ⚠ WARNING | Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ⚠ CAUTION | Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. |

| Symbol | Description |
|--------|-------------|
| ⚠ NOTICE | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury. |
| 📖 NOTE | Calls attention to important information, best practices and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration. |

# Mappings between Product Software Versions and NMS Versions

The mappings between product software versions and NMS versions are as follows.

| CE8800&7800&6800&5800 series switches Product Software Version | NMS |
|---|---|
| V200R001C00 | eSight V300R006C00/iManager U2000 V200R016C50 |

# Mappings between Product Software Versions and Controller Versions

The mappings between product software versions and Controller versions are as follows.

| CE8800&7800&6800&5800 series switches Product Software Version | NMS |
|---|---|
| V200R001C00 | Agile Controller - DCN V200R001C00 |

# Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

## Changes in Issue 03 (2016-09-10) V200R001C00

This version is updated according to product changes.

## Changes in Issue 02 (2016-07-20) V200R001C00

This version is updated according to product changes.

## Changes in Issue 01 (2016-04-15) V200R001C00

Initial commercial release.

# Contents

# 1 Product Positioning and Characteristics

## About This Chapter

# 1.1 Product Positioning

⚠ **NOTICE**

The CE8800&7800&6800&5800 series switches are class A products and may cause radio interference. Customers should take appropriate preventative measures.

Huawei CE8800&7800&6800&5800 series switches are next-generation data center switches designed for high-performance data centers. The CE8800, CE7800 and CE6800 series switches support 10GE access, while the CE5800 series switches support GE access.

The CE8800&7800&6800&5800 series switches function as access switches. As shown in **Figure 1-1**, servers connect to CE8800&7800&6800&5800 series switches through GE/10GE/25GE uplinks; and CE8800&7800&6800&5800 series switches connect to core switches CE12800 through 10GE/40GE/100GE uplinks.

**Figure 1-1** CE8800&7800&6800&5800 series switches on the network
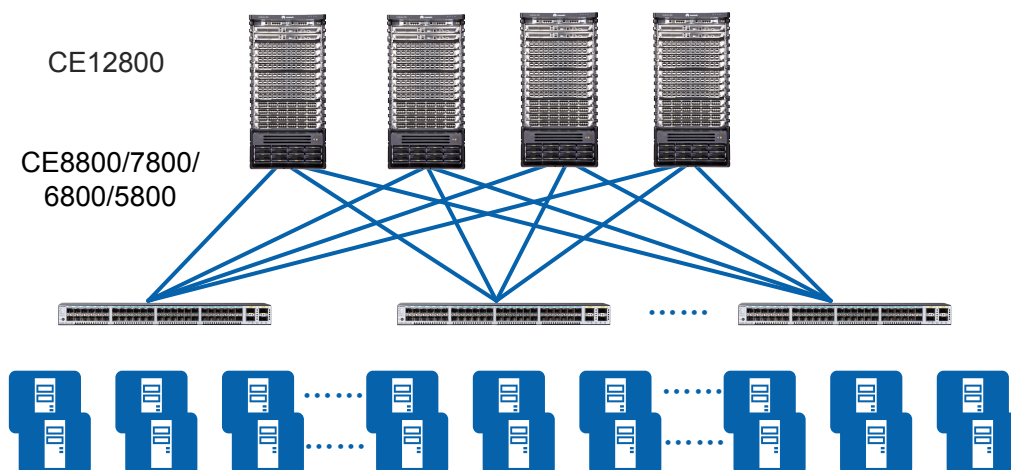


# 1.2 Product Characteristics

CE8800&7800&6800&5800 series switches use industry-leading hardware and software platforms. Their optimized system architecture and features provide higher performance, larger capacity, and richer services for data centers. In addition, these switches are easy to install and maintain.

## 1.2.1 High-Performance, High Port Density, and Support for 100G

CE8800&7800&6800&5800 series switches use cutting-edge hardware platforms in the industry. By using a 1U/2U (1 U = 44.45 mm) box, CE8800&7800&6800&5800 series switches provide high port densities and line-rate forwarding capabilities. Next-generation, high-performance servers in super high density arrangements can easily connect to CE8800&7800&6800&5800 series switches.

- CE5810-24T4S-EI: provides twenty-four 10/100/1000BASE-T Ethernet ports and four 10GE SFP+ Ethernet optical ports.

- CE5810-48T4S-EI: provides forty-eight 10/100/1000BASE-T Ethernet ports and four 10GE SFP+ Ethernet optical ports.

- CE5850-48T4S2Q-EI: provides forty-eight 10/100/1000BASE-T Ethernet ports, four 10GE SFP+ Ethernet optical ports, and two 40GE QSFP+ Ethernet optical ports.

- CE5850-48T4S2Q-HI: provides forty-eight 10/100/1000BASE-T Ethernet ports, four 10GE SFP+ Ethernet optical ports, and two 40GE QSFP+ Ethernet optical ports. The switch also supports a large buffer to handle burst traffic.

- CE5855-24T4S2Q-EI: provides twenty-four 10/100/1000BASE-T Ethernet ports, four 10GE SFP+ Ethernet optical ports, and two 40GE QSFP+ Ethernet optical ports.

- CE5855-48T4S2Q-EI: provides forty-eight 10/100/1000BASE-T Ethernet ports, four 10GE SFP+ Ethernet optical ports, and two 40GE QSFP+ Ethernet optical ports.

- CE6810-48S4Q-EI: provides forty-eight 10GE SFP+ Ethernet optical ports and four 40GE QSFP+ Ethernet optical ports.

- CE6810-48S4Q-EI: provides forty-eight 10GE SFP+ Ethernet optical ports and four 40GE QSFP+ Ethernet optical ports.

- CE6810-48S-LI: provides forty-eight 10GE SFP+ Ethernet optical ports.

- CE6810-32T16S4Q-LI: provides thirty-two 10GBASE-T Ethernet electrical ports, sixteen 10GE SFP+ Ethernet optical ports, and four 40GE QSFP+ Ethernet optical ports.

- CE6810-24S2Q-LI: provides twenty-four 10GE SFP+ Ethernet optical ports and two 40GE QSFP+ Ethernet optical ports.

- CE6850-48S4Q-EI: provides forty-eight 10GE SFP+ Ethernet optical ports and four 40GE QSFP+ Ethernet optical ports.

- CE6850-48T4Q-EI: provides forty-eight 10GE BASE-T Ethernet ports and four 40GE QSFP+ Ethernet optical ports.

- CE6850-48S6Q-HI: provides forty-eight 10GE SFP+ Ethernet optical ports and six 40GE QSFP+ Ethernet optical ports.

- CE6850-48T6Q-HI: provides forty-eight 10GE BASE-T Ethernet electrical ports and six 40GE QSFP+ Ethernet optical ports

- CE6851-48S6Q-HI: provides forty-eight 10GE SFP+ Ethernet optical ports and six 40GE QSFP+ Ethernet optical ports.

- CE6850U-48S6Q-HI: provides forty-eight 10GE SFP+/FC Ethernet optical ports and six 40GE QSFP+ Ethernet optical ports.

- CE6850U-24S2Q-HI: provides twenty-four 10GE SFP+/FC Ethernet optical ports and two 40GE QSFP+ Ethernet optical ports.

- CE6855-48S6Q-HI: provides forty-eight 10GE SFP+ Ethernet optical ports and six 40GE QSFP+ Ethernet optical ports.

- CE6855-48T6Q-HI: provides forty-eight 10GE BASE-T Ethernet electrical ports and six 40GE QSFP+ Ethernet optical ports.

- CE6870-24S6CQ-EI: provides twenty-four 10GE SFP+ Ethernet optical ports and six 40GE/100GE QSFP28 Ethernet optical ports.

- CE6870-48S6CQ-EI: provides forty-eight 10GE SFP+ Ethernet optical ports and six 40GE/100GE QSFP28 Ethernet optical ports.

- CE7850-32Q-EI: provides thirty-two 40GE QSFP+ Ethernet optical ports.

- CE7855-32Q-EI: provides thirty-two 40GE QSFP+ Ethernet optical ports.
- CE8860-4C-EI: provides four slots and a maximum of thirty-two 100GE QSFP28 Ethernet optical ports, sixty-four 40GE QSFP+ Ethernet optical ports, and ninety-six 10GE Ethernet electrical ports + eight 100GE/40GE QSFP28 Ethernet optical ports or ninety-six 10GE/25GE SFP28 Ethernet optical ports + eight 100GE/40GE QSFP28 Ethernet optical ports.

CE8800&7800&6800&5800 series switches provide high-performance 40GE/100GE ports, which can connect to high-density 40GE/100GE line processing units (LPUs) on CE12800 switches to construct high-performance data center networks.

## 1.2.2 Front-to-Rear/Rear-to-Front Ventilation Channels

CE8800&7800&6800&5800 series switches use front-to-rear/rear-to-front ventilation channels. This design isolates cold air from hot air channels, improves heat dissipation efficiency, and lowers power consumption, without the need to reconstruct racks in the data center equipment room.

**Figure 1-2** and **Figure 1-3** show the front-to-rear/rear-to-front ventilation channels on CE8800&7800&6800&5800 series switches. The airflow direction in the ventilation channels can be changed by configuring fan modules and power modules.

**Figure 1-2** Front-to-back airflow
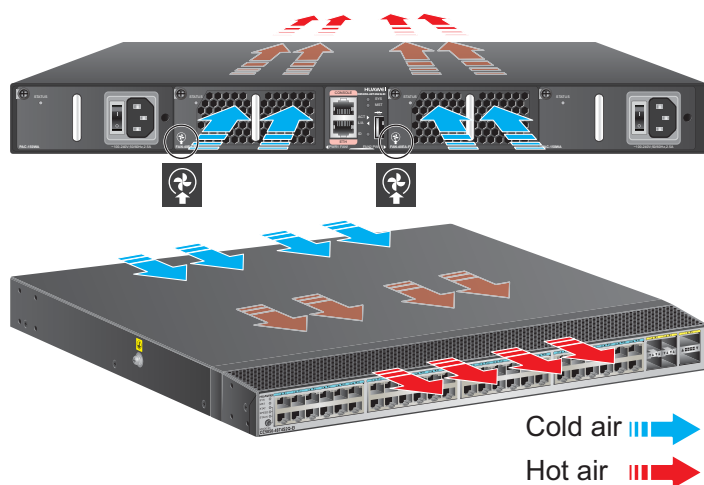
**Figure 1-3** Back-to-front airflow



Cold air
Hot air
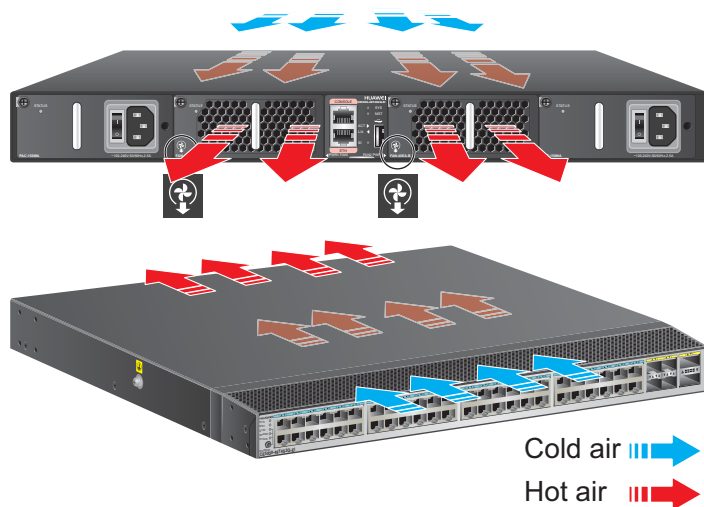
## 1.2.3 Simplified Operations and Maintenance

CE8800&7800&6800&5800 series switches' architecture separates the data plane from the management plane.

- The management ports, fan modules, and power modules are at the front side of the switch for easy maintenance.

- The data ports are at the rear side of the switch to facilitate cabling and maintenance.

CE8800&7800&6800&5800 series switches optimize indicators in the following aspects to facilitate easy maintenance of data center networks with high device densities:

- Redundant system indicator

  CE8800&7800&6800&5800 series switches have system indicators on both the front side (with management ports) and rear side (with data ports). These system indicators show the system status and stack status, helping administrators easily monitor the system status.

- Easy-to-read port indicator

  Innovative 40G port indicators clearly show the running status of 40GE ports that have been converted into four 10GE ports.

- Easy-to-maintain stack indicator

  The stack indicator shows the role and ID of the switch in a stack system, helping administrators maintain the stack system.

- Innovative positioning indicator

  CE8800&7800&6800&5800 series switches have a positioning indicator that allows administrators to remotely position a switch quickly. Administrators can turn on switches' positioning indicators through the network management system (NMS) or console so that they can quickly find the switches that require maintenance. Positioning indicators are blue, making them easy to find.

## 1.2.4 Easy-to-Deploy, Easy-to-Maintain High-Performance Stacking

A maximum of 16 CE8800&7800&6800&5800 series switches can be added to a stack system. The stack system has the following advantages:

- High performance

  In the stack, a maximum of 768 GE or 10GE interfaces are allowed.

- High bandwidth

  The CE8860 supports 1600 Gbit/s stack bandwidth, the CE7800 series switches support 640 Gbit/s stack bandwidth, the CE6800 series switches support up to 1600 Gbit/s stack bandwidth, the CE5800 series switches support up to 80 Gbit/s stack bandwidth. These stack bandwidth capabilities reduce the possibility of stack bandwidth bottlenecks.

- Fast recovery

  The ring stack topology allows for system recovery within 200 ms.

- Easy to deploy and maintain

  - The pre-deployment and offline configuration functions allow users to plan and pre-configure the system and add devices on demand. This feature offers a Pay As You Grow solution.

  - Users can specify device IDs in a stack system to easily identify, locate, and maintain devices.

  - Indicators clearly identify the role and status of the device in a stack system. With these indicators, users can complete basic maintenance tasks on a stack system without a PC.

- Simple upgrade

  A stack system supports quick software upgrades and automatic software upgrades, simplifying the upgrade process and reducing workload.

The CE7800&CE6800&5800 series switches also support the SVF function, which enables a parent switch (such as CE6850-48S4Q-EI) to use multiple low-cost fixed switches (such as CE5810-24T4S-EI) as remote interface cards. This function increases the port density of the parent switch and realizes centralized management of switches, allowing for high-density access and simple management in data centers.

## 1.2.5 Abundant Data Center Service Features

CE8800&7800&6800&5800 series switches have a wide range of data center service features, including the following:

- Fiber Channel over Ethernet (FCoE) and Data Center Bridging (DCB)

  - FCoE, Data Center Bridging Exchange (DCBX) in 802.1Qaz, Priority-based Flow Control (PFC) in 802.1Qbb, and Enhanced Transmission Selection (ETS) in 802.1Qaz allow fiber channels (FCs) to run on a converged lossless Enhanced Ethernet, thereby lowering networking costs.

  - FCoE and DCB can seamlessly interconnect with the existing FC infrastructure, protecting investments in the FC storage area network (FC SAN).

- Virtualization and virtual machine (VM) access

  - Server virtualization improves data center efficiency.

  - VM detection enables switches to automatically migrate network policies during VM migrations, so network sources can be allocated on demand. With the technologies that enable large Layer 2 networking, VMs can migrate freely across the entire data center network.

- Transparent Interconnection of Lots of Links (TRILL)
    - TRILL is an Internet Engineering Task Force (IETF) standard that allows for super large, flexible networking.
    - TRILL implements multi-path load balancing to balance traffic among multiple paths in response to service requirements.
    - TRILL can quickly detect network changes and complete network convergence within a short time.
- Virtual eXtensible Local Area Network (VXLAN)
    - VXLAN encapsulates data packets sent from VMs into UDP packets and encapsulates IP and MAC addresses used on the physical network into outer headers. The network is only aware of the encapsulated parameters. This greatly reduces the number of MAC address entries required on large Layer 2 networks.
    - VXLAN uses a VXLAN network identifier (VNI) field similar to the VLAN ID field defined in IEEE 802.1Q. The VNI field has 24 bits and can identify a maximum of 16M VXLAN segments.
    - When VXLAN is used to construct a large Layer 2 network, VM IP and MAC addresses can remain unchanged after VM migration.

## 1.2.6 Enhanced, Programmable Open System

On CloudEngine series switches, the open system runs on the same Linux platform as the VRP system. The open system supports standard Linux instructions and is able to run the shell script and load the third-party software. It provides standard NetConf and OpenFlow interfaces of the VRP system for third-party software through the virtual network between the open system and VRP system. By doing this, the open system implements device programmability and third-party software integration, meeting requirements for device openness and flexibility.

Through the open system, you can run standard Linux shell script on the device and loads various third-party software. The open system simplifies device management and maintenance, extends device functions, and allows devices to be rapidly integrated into the SDN and cloud computing platform.

Only the CE6850EI, CE6850HI, CE6850U-HI, CE6851HI, CE6855HI, CE6870EI, CE7850EI, CE7855EI, and CE8860EI support the open system.

# 2 Typical Applications

## About This Chapter

# 2.1 ToR Application

Top of rack (ToR) is a cabling mode in a server cabinet. Switches deployed in ToR mode are called ToR switches. The ToR mode applies to data center networks with high server densities. As shown in **Figure 2-1**, ToR switches are deployed at the top of server cabinets. Two ToR switches in two adjacent server cabinets form a stack system, and servers are dual-homed to the two ToR switches. The access ports on the two ToR switches constitute a link aggregation group (LAG).

**Figure 2-1** ToR application
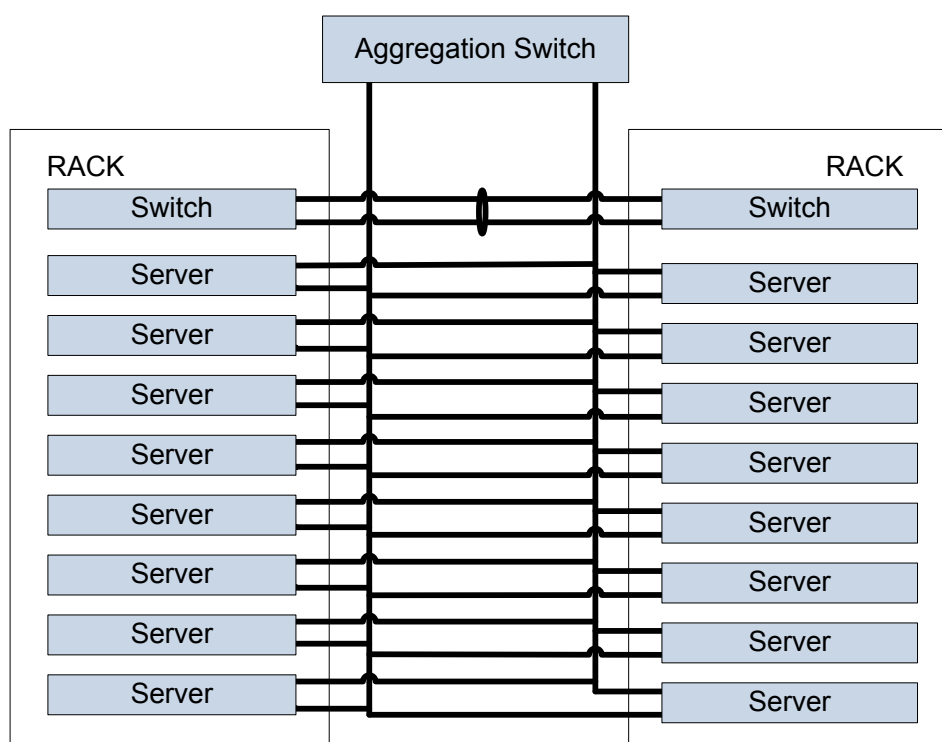


ToR networking has the following advantages:

- The stack system can eliminate bandwidth bottlenecks. In the stack system, ToR switches are stacked using 10GE/40GE ports, and all stack cables work in Active state, greatly improving stack bandwidths.

- The access reliability of the stack system is high. Master and backup ports on servers are connected to two ToR switches simultaneously, and the access ports on the two ToR switches work in LAG mode. Therefore, the Spanning Tree Protocol (STP) is not required, and a switchover is completed within 100 ms once a fault has occurred.

- ToR switches support 100GE uplink ports that can be used together with high-density 100GE LPUs on CE12800 switches to construct high-performance 100GE data center networks.

## 2.2 EoR Application

End of row (EoR) is a cabling mode in a server cabinet. Switches deployed in EoR mode are called EoR switches.

The EoR mode applies to data center networks with low densities of servers. At the end of each row of server cabinets, there are two network cabinets where access switches are installed. Servers in cabinets along the row share these access switches. As shown in **Figure 2-2**, access switches in the network cabinets form a stack system and provide high access port densities.

**Figure 2-2** EoR application
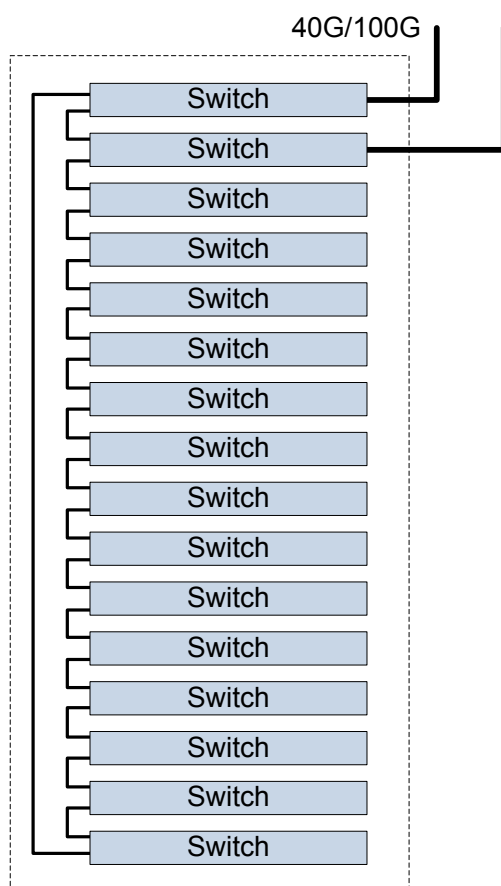


EoR networking has the following advantages:

- High access port densities. A maximum of 16 CE8800&7800&6800&5800 series switches can be added to a stack system and provide more than 768 GE/10GE access ports.

- Improved user experience. CE8800&7800&6800&5800 series switches use the same operating system as the CE12800 and support chassis architecture. After being stacked, CE8800&7800&6800&5800 series switches can work as a chassis switch and provide the same application experience as the CE12800.

- Super-high stack bandwidth. The EoR networking mode eliminates the stack system bottleneck to the maximum extent and improves performance of the entire system.

# 3 Structures of CE8800&7800&6800&5800 series switches

Table 3-1 lists the mapping between the CE8800&7800&6800&5800 series switches and software versions.

Table 3-1 Mapping between the CE8800&7800&6800&5800 series switches and software versions

| Series | | Model | Available Version |
|--------|--------|-------|-------------------|
| CE8800 | CE8860 | CE8860-4C-EI | V100R006C00 and later versions |
| CE7800 | CE7850 | CE7850-32Q-EI | V100R003C00 and later versions |
| | CE7855 | CE7855-32Q-EI | V200R001C00 and later versions |
| CE6800 | CE6810 | CE6810-48S4Q-EI | V100R003C00 and later versions |
| | | CE6810-48S4Q-LI | V100R003C10 and later versions |
| | | CE6810-48S-LI | V100R003C10 and later versions |
| | | CE6810-32T16S4Q-LI | V100R005C10 and later versions |
| | | CE6810-24S2Q-LI | V100R005C10 and later versions |
| | CE6850 | CE6850-48S4Q-EI | V100R001C00 and later versions |
| | | CE6850-48T4Q-EI | V100R001C00 and later versions |
| | | CE6850-48S6Q-HI | V100R005C00 and later versions |
| | | CE6850-48T6Q-HI | V100R005C10 and later versions |
| | | CE6851-48S6Q-HI | V100R005C10 and later versions |
| | | CE6850U-24S2Q-HI | V100R005C10 and later versions |
| | | CE6850U-48S6Q-HI | V100R005C10 and later versions |
| | | CE6855-48S6Q-HI | V200R001C00 and later versions |

| Series | Model | | Available Version |
|---|---|---|---|
| | | CE6855-48T6Q-HI | V200R001C00 and later versions |
| | CE6870 | CE6870-24S6CQ-EI | V200R001C00 and later versions |
| | | CE6870-48S6CQ-EI | V200R001C00 and later versions |
| CE5800 | CE5810 | CE5810-24T4S-EI | V100R002C00 and later versions |
| | | CE5810-48T4S-EI | V100R002C00 and later versions |
| | CE5850 | CE5850-48T4S2Q-EI | V100R001C00 and later versions |
| | | CE5850-48T4S2Q-HI | V100R003C00 and later versions |
| | CE5855 | CE5855-48T4S2Q-EI | V100R005C10 and later versions |
| | | CE5855-24T4S2Q-EI | V100R005C10 and later versions |

☐ **NOTE**

The figures in this document are for reference only.

## CE8860-4C-EI

**Figure 3-1** Appearance of the CE8860-4C-EI
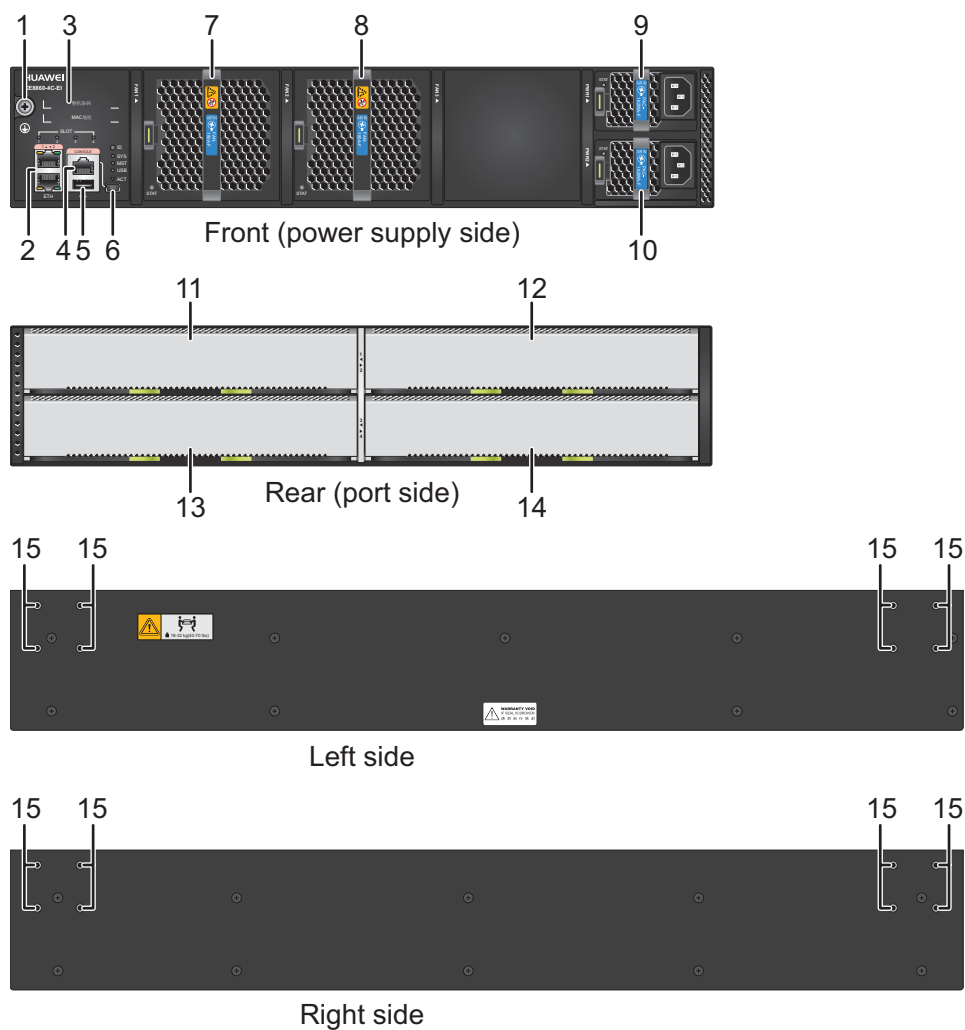


| 1 | Ground screw | 2 | Two ETH management ports (RJ45) |
|---|---|---|---|
| 3 | ESN and MAC address label | 4 | Console port |
| 5 | USB port | 6 | Mini USB port |
| 7 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-180A series fan modules | 8 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-180A series fan modules |

| 9 | Power supply slot 1 <br><br> Applicable power modules: <br> • 1200 W AC&240 V DC power module <br> • 1200 W high-voltage DC power module | 10 | Power supply slot 2 <br><br> Applicable power modules: <br> • 1200 W AC&240 V DC power module <br> • 1200 W high-voltage DC power module |
|---|---|---|---|
| 11 | Extended card slot 1 <br><br> Applicable cards: <br> • CE88-D8CQ <br> • CE88-D16Q <br> • CE88-D24T2CQ <br> • CE88-D24S2CQ | 12 | Extended card slot 2 <br><br> Applicable cards: <br> • CE88-D8CQ <br> • CE88-D16Q <br> • CE88-D24T2CQ <br> • CE88-D24S2CQ |
| 13 | Extended card slot 3 <br><br> Applicable cards: <br> • CE88-D8CQ <br> • CE88-D16Q <br> • CE88-D24T2CQ <br> • CE88-D24S2CQ | 14 | Extended card slot 4 <br><br> Applicable cards: <br> • CE88-D8CQ <br> • CE88-D16Q <br> • CE88-D24T2CQ <br> • CE88-D24S2CQ |
| 15 | Mounting holes for mounting brackets | - | - |

## CE7850-32Q-EI

**Figure 3-2** Appearance of the CE7850-32Q-EI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1 Applicable power modules: ● 600 W AC power module | 2 | Power supply slot 2 Applicable power modules: ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 Applicable fan modules: ● FAN-40HA series fan modules | 4 | Fan slot 2 Applicable fan modules: ● FAN-40HA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label **NOTE** This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Thirty-two 40GE QSFP+ Ethernet optical ports **NOTE** A 40GE QSFP+ port can be split into four 10GE ports. Applicable modules and cables: ● 40GE optical module ● QSFP+ AOC cable (QSFP+ to QSFP +) ● QSFP+ AOC cable (QSFP+ to 4*SFP +) ● QSFP+ copper cables (QSFP+ to 4*SFP+) ● QSFP+ copper cables (QSFP+ to QSFP+) | 10 | Three port-side mounting holes for mounting brackets |
|---|---|---|---|
| 11 | Four middle mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE7855-32Q-EI

Figure 3-3 Appearance of the CE7855-32Q-EI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1 <br><br> Applicable power modules: <br> ● 600 W AC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br> ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br> ● FAN-40HA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br> ● FAN-40HA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Thirty-two 40GE QSFP+ Ethernet optical ports <br> **NOTE** <br> A 40GE QSFP+ port can be split into four 10GE ports. <br><br> Applicable modules and cables: <br> ● 40GE optical module <br> ● QSFP+ AOC cable (QSFP+ to QSFP+) <br> ● QSFP+ AOC cable (QSFP+ to 4*SFP+) <br> ● QSFP+ copper cables (QSFP+ to 4*SFP+) <br> ● QSFP+ copper cables (QSFP+ to QSFP+) | 10 | Three port-side mounting holes for mounting brackets |
| 11 | Four middle mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE6810-48S4Q-EI

Figure 3-4 Appearance of the CE6810-48S4Q-EI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

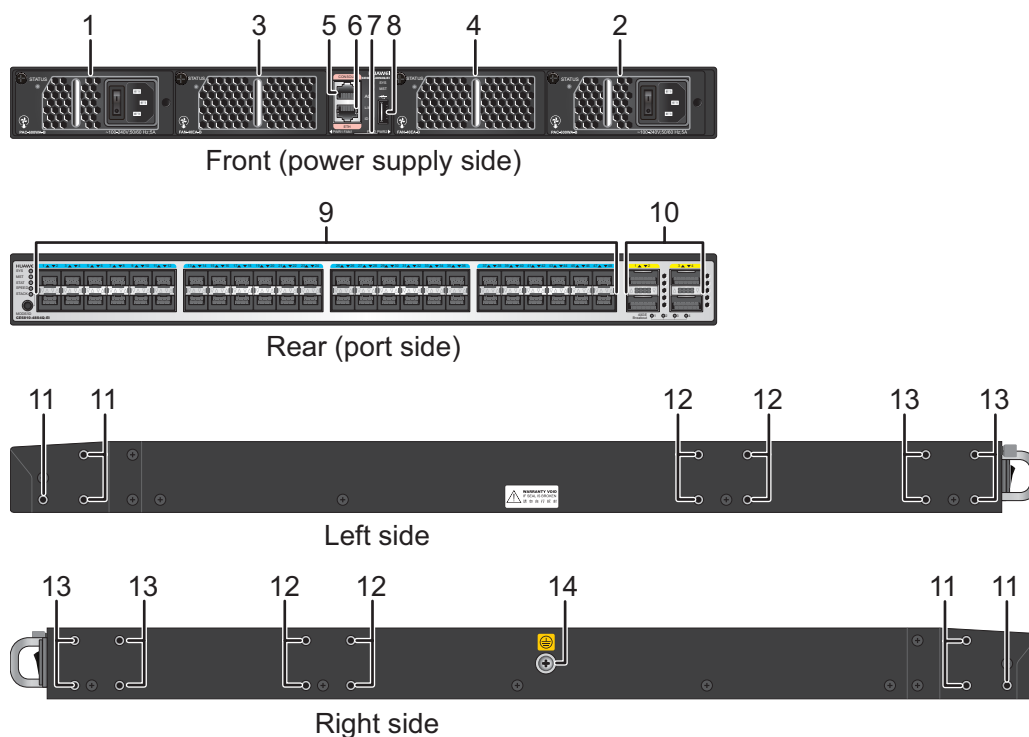| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br><br>● GE optical module<br><br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br><br>● SFP+ AOC cable<br><br>● SFP+ copper cables | 10 | Four 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br><br>● 40GE optical module<br><br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br><br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br><br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br><br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four middle mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE6810-48S4Q-LI

**Figure 3-5** Appearance of the CE6810-48S4Q-LI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1<br><br>Applicable power modules:<br>● 350 W DC power module<br>● 600 W AC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br>● 350 W DC power module<br>● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>　This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Four 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>　A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four middle mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE6810-48S-LI

Figure 3-6 Appearance of the CE6810-48S-LI



Front (power supply side)
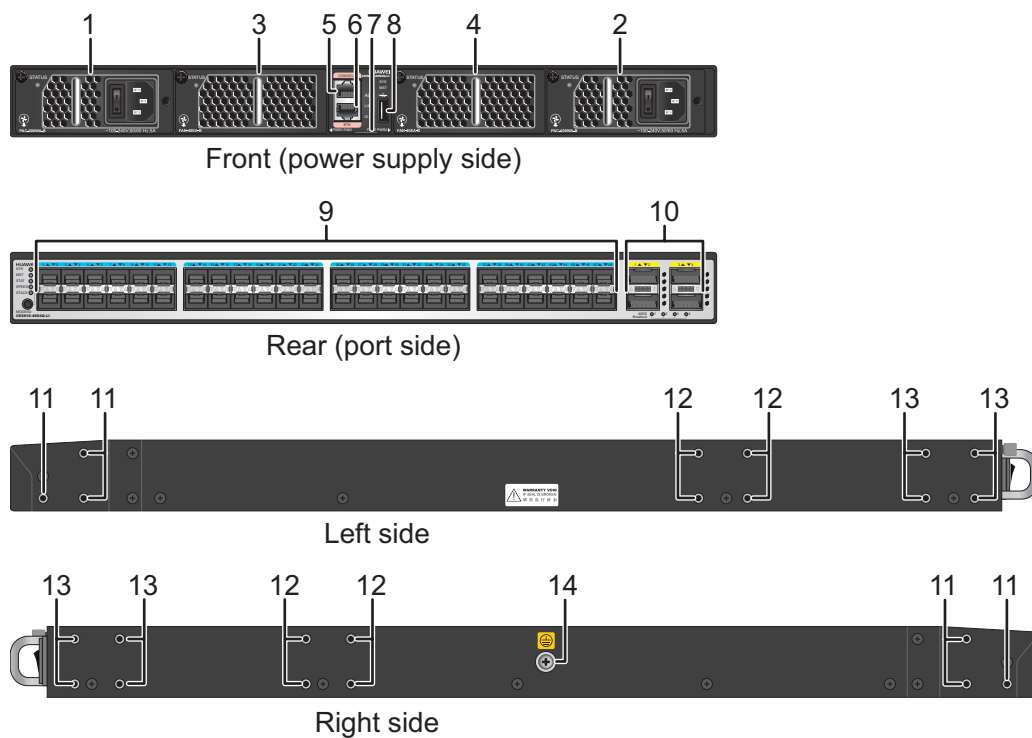
Rear (port side)

Left side

Right side

| 1 | Power supply slot 1 Applicable power modules: ● 350 W DC power module ● 600 W AC power module | 2 | Power supply slot 2 Applicable power modules: ● 350 W DC power module ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 Applicable fan modules: ● FAN-40EA series fan modules | 4 | Fan slot 2 Applicable fan modules: ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label **NOTE** This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

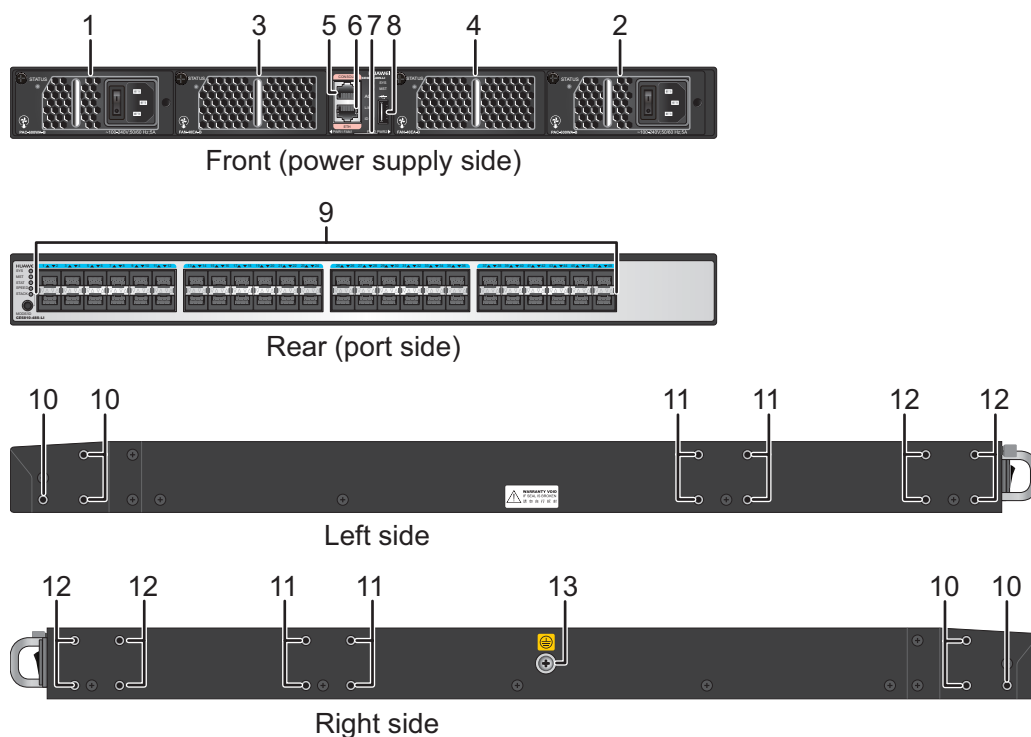| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Three port-side mounting holes for mounting brackets |
|---|---|---|---|
| 11 | Four middle mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE6810-32T16S4Q-LI

Figure 3-7 Appearance of the CE6810-32T16S4Q-LI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1<br><br>Applicable power modules:<br><br>● 350 W DC power module<br>● 600 W AC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br><br>● 350 W DC power module<br>● 600 W AC power module |
|---|---|---|---|

| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules |
|---|---|---|---|
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>　This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Thirty-two 10GBASE-T Ethernet electrical ports | 10 | Sixteen 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables |
| 11 | Four 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>　A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) | 12 | Three port-side mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE6810-24S2Q-LI

Figure 3-8 Appearance of the CE6810-24S2Q-LI



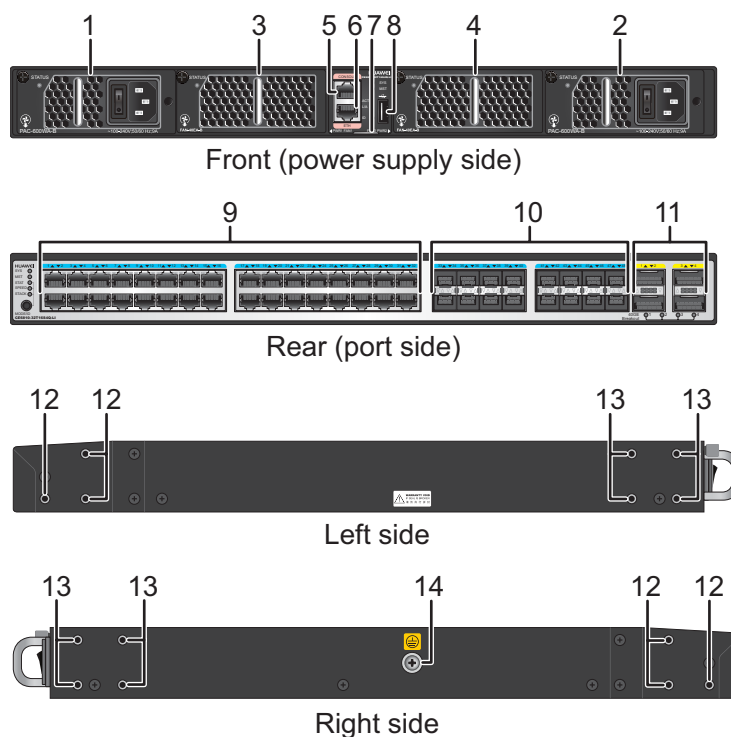| | | | |
|---|---|---|---|
| 1 | Power supply slot 1 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module |
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Twenty-four 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Two 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>　A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| --- | --- | --- | --- |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four middle mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE6850-48S4Q-EI

**Figure 3-9** Appearance of the CE6850-48S4Q-EI
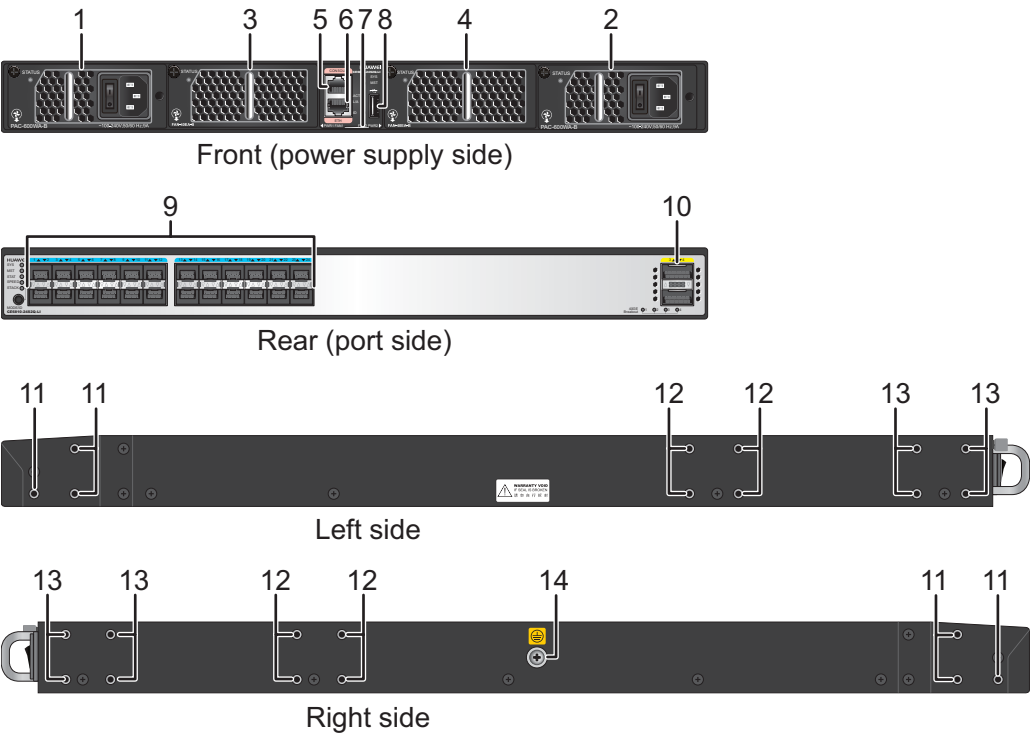
| 1 | Power supply slot 1<br><br>Applicable power modules:<br>● 350 W AC power module<br>● 350 W DC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br>● 350 W AC power module<br>● 350 W DC power module |
|---|---|---|---|
| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Four 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four middle mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE6850-48T4Q-EI

**Figure 3-10** Appearance of the CE6850-48T4Q-EI
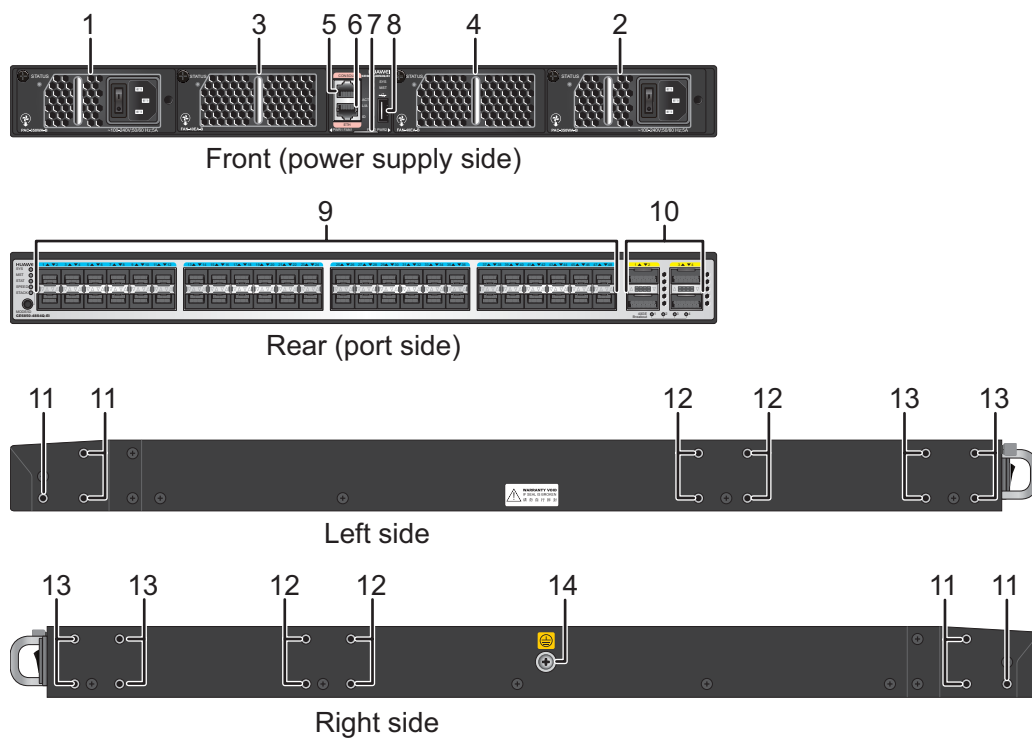


| 1 | Power supply slot 1<br><br>Applicable power modules:<br>● 350 W AC power module<br>● 600 W AC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br>● 350 W AC power module<br>● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

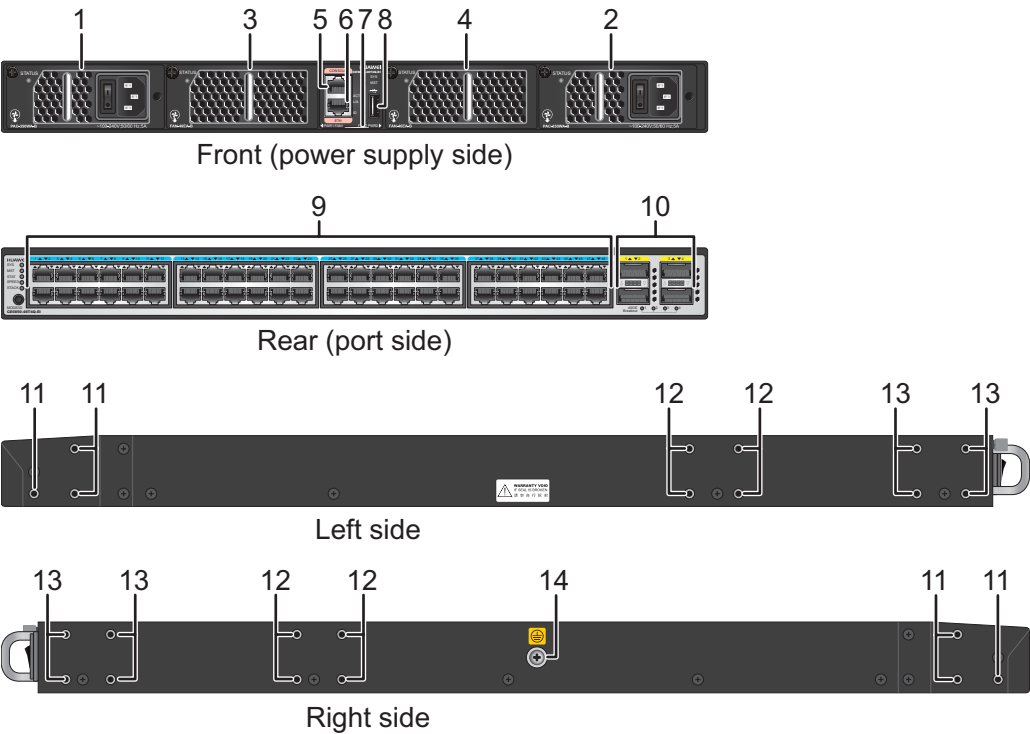| 9 | Forty-eight 10GBASE-T Ethernet electrical ports<br>**NOTE**<br>When a CE6850-48T4Q-EI switch uses 350 W AC power modules and all its ports are in use, the length of each network cable used on the switch cannot exceed 30 m. | 10 | Four 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4\*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4\*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
|---|---|---|---|
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four middle mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

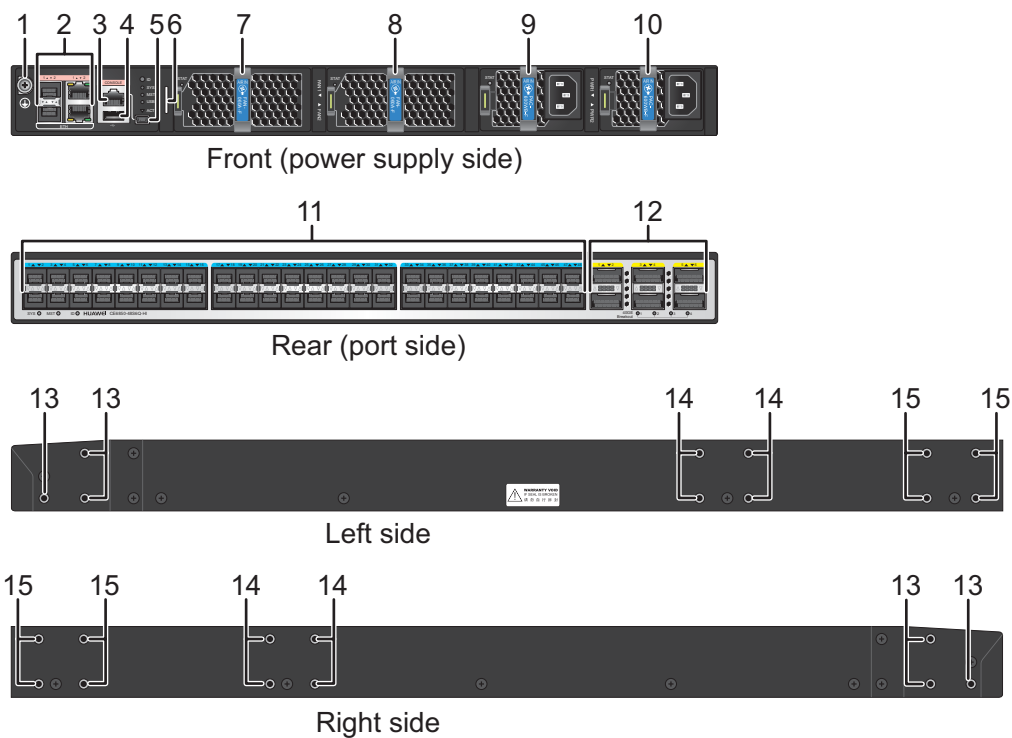## CE6850-48S6Q-HI

Figure 3-11 Appearance of the CE6850-48S6Q-HI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Ground screw | 2 | Two ETH management ports (combo)<br><br>Applicable transceiver modules for the GE optical port of the combo port:<br>● FE optical module<br>● GE optical module<br>**NOTE**<br>The combo optical port uses a 100M or GE optical module and matching fibers. A 100M optical module can be used only after the switch starts successfully. |
| 3 | Console port | 4 | USB port |
| 5 | Mini USB port | 6 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. |
| 7 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-060A series fan modules | 8 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-060A series fan modules |
| 9 | Power supply slot 1<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module | 10 | Power supply slot 2<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module |
| 11 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 12 | Six 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 13 | Three port-side mounting holes for mounting brackets | 14 | Four middle mounting holes for mounting brackets |

| 15 | Four power-supply-side mounting holes for mounting brackets | - | - |
|----|------------------------------------------------------------|---|---|

## CE6850-48T6Q-HI

**Figure 3-12** Appearance of the CE6850-48T6Q-HI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Ground screw | 2 | Two ETH management ports (combo) |
|---|--------------|---|----------------------------------|
|   |              |   | Applicable transceiver modules for the GE optical port of the combo port: |
|   |              |   | ● FE optical module |
|   |              |   | ● GE optical module |
|   |              |   | **NOTE** |
|   |              |   | The combo optical port uses a 100M or GE optical module and matching fibers. A 100M optical module can be used only after the switch starts successfully. |
| 3 | Console port | 4 | USB port |
| 5 | Mini USB port | 6 | Barcode label |
|   |              |   | **NOTE** |
|   |              |   | This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. |

| 7 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-060A series fan modules | 8 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-060A series fan modules |
|---|---|---|---|
| 9 | Power supply slot 1<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module | 10 | Power supply slot 2<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module |
| 11 | Forty-eight 10GBASE-T Ethernet electrical ports | 12 | Six 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 13 | Three port-side mounting holes for mounting brackets | 14 | Four middle mounting holes for mounting brackets |
| 15 | Four power-supply-side mounting holes for mounting brackets | - | - |

## CE6855-48T6Q-HI

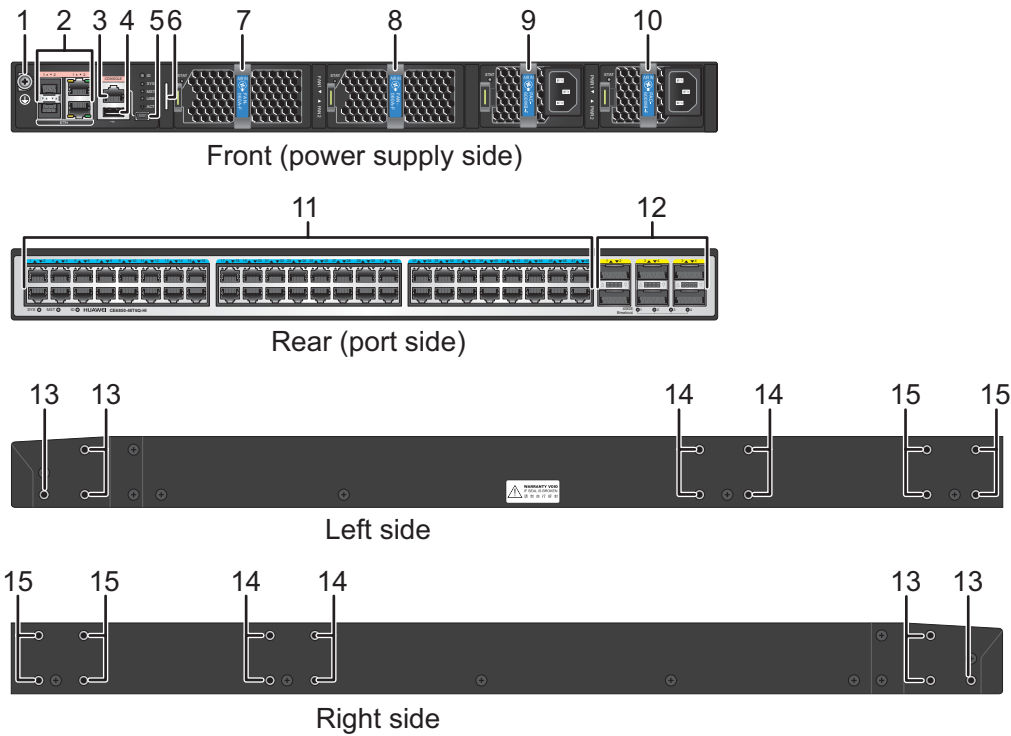Figure 3-13 Appearance of the CE6855-48T6Q-HI



| 1 | Ground screw | 2 | Two ETH management ports (combo) |
|---|---|---|---|
| | | | Applicable transceiver modules for the GE optical port of the combo port:  ● FE optical module  ● GE optical module  **NOTE**  The combo optical port uses a 100M or GE optical module and matching fibers. A 100M optical module can be used only after the switch starts successfully. |
| 3 | Console port | 4 | USB port |
| 5 | Mini USB port | 6 | Barcode label  **NOTE**  This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. |
| 7 | Fan slot 1  Applicable fan modules:  ● FAN-060A series fan modules | 8 | Fan slot 2  Applicable fan modules:  ● FAN-060A series fan modules |

| 9 | Power supply slot 1<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module | 10 | Power supply slot 2<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module |
|---|---|---|---|
| 11 | Forty-eight 10GBASE-T Ethernet electrical ports | 12 | Six 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 13 | Three port-side mounting holes for mounting brackets | 14 | Four middle mounting holes for mounting brackets |
| 15 | Four power-supply-side mounting holes for mounting brackets | - | - |

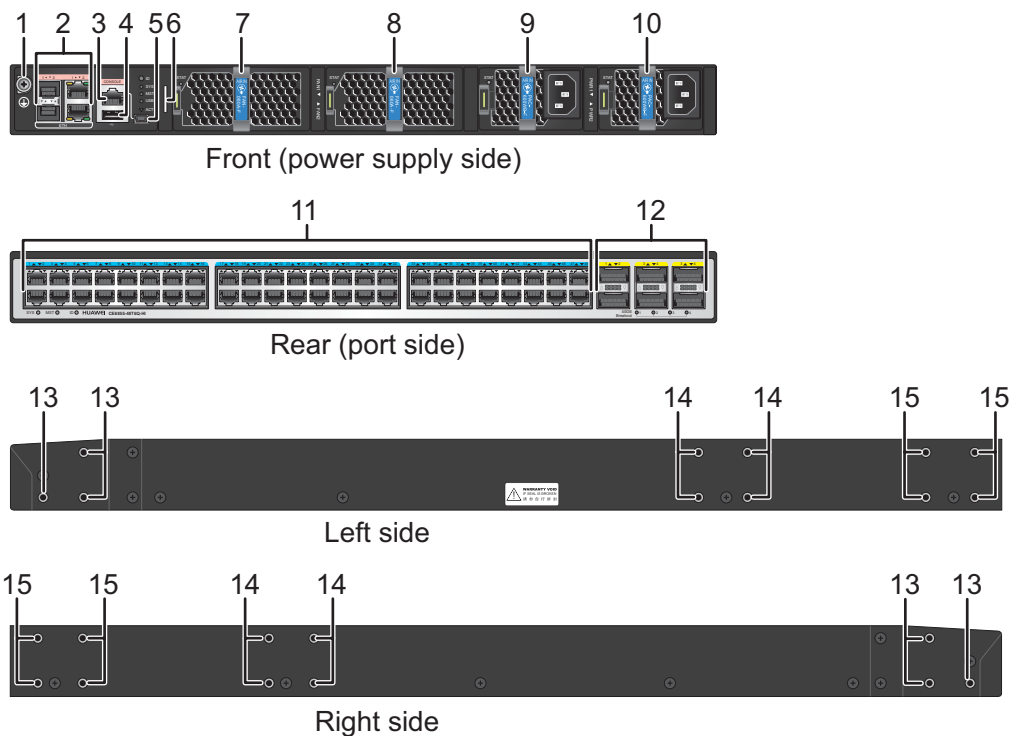## CE6855-48S6Q-HI

Figure 3-14 Appearance of the CE6855-48S6Q-HI



| 1 | Power supply slot 1 Applicable power modules: ● 350 W DC power module ● 600 W AC power module | 2 | Power supply slot 2 Applicable power modules: ● 350 W DC power module ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 Applicable fan modules: ● FAN-40EA series fan modules | 4 | Fan slot 2 Applicable fan modules: ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label **NOTE** This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Six 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br><br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
|---|---|---|---|
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE6851-48S6Q-HI

Figure 3-15 Appearance of the CE6851-48S6Q-HI



Front (power supply side)

Rear (port side)

Left side

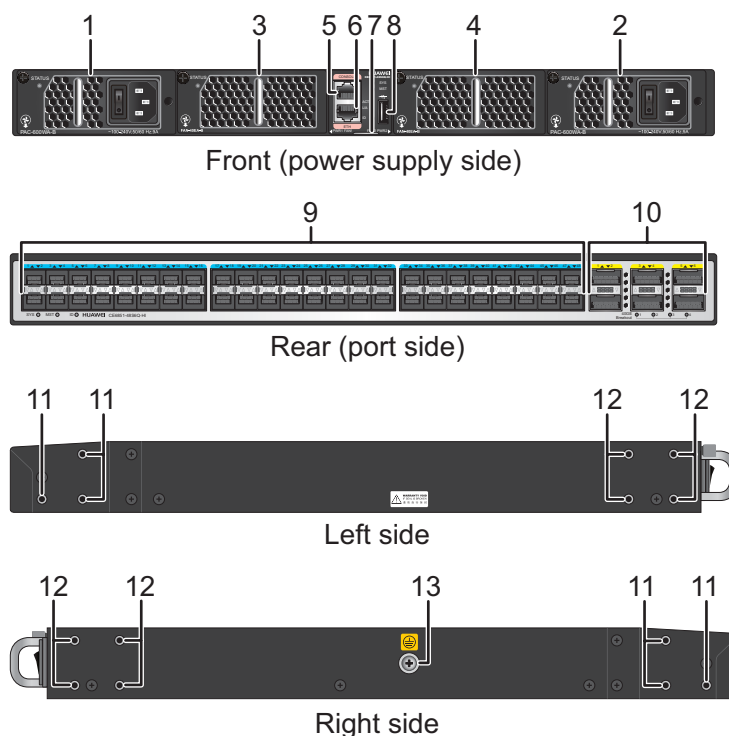Right side

| 1 | Power supply slot 1 <br><br> Applicable power modules: <br><br> ● 350 W DC power module <br> ● 600 W AC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br><br> ● 350 W DC power module <br> ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br><br> ● FAN-40EA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br><br> ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br><br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Forty-eight 10GE SFP+ Ethernet optical ports <br><br> Applicable modules and cables: <br><br> ● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported) <br> ● GE optical module <br> ● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s) <br> ● SFP+ AOC cable <br> ● SFP+ copper cables | 10 | Six 40GE QSFP+ Ethernet optical ports <br> **NOTE** <br> A 40GE QSFP+ port can be split into four 10GE ports. <br><br> Applicable modules and cables: <br><br> ● 40GE optical module <br> ● QSFP+ AOC cable (QSFP+ to QSFP+) <br> ● QSFP+ AOC cable (QSFP+ to 4*SFP+) <br> ● QSFP+ copper cables (QSFP+ to 4*SFP+) <br> ● QSFP+ copper cables (QSFP+ to QSFP+) |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE6850U-48S6Q-HI

**Figure 3-16** Appearance of the CE6850U-48S6Q-HI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Ground screw | 2 | Two ETH management ports (combo) |
|---|---|---|---|
| | | | Applicable transceiver modules for the GE optical port of the combo port: |
| | | | ● FE optical module |
| | | | ● GE optical module |
| | | | **NOTE** |
| | | | The combo optical port uses a 100M or GE optical module and matching fibers. A 100M optical module can be used only after the switch starts successfully. |
| 3 | Console port | 4 | USB port |
| 5 | Mini USB port | 6 | Barcode label |
| | | | **NOTE** |
| | | | This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. |
| 7 | Fan slot 1 | 8 | Fan slot 2 |
| | Applicable fan modules: | | Applicable fan modules: |
| | ● FAN-060A series fan modules | | ● FAN-060A series fan modules |

| 9 | Power supply slot 1<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module | 10 | Power supply slot 2<br><br>Applicable power modules:<br>● 600 W AC&240 V DC power module<br>● 600 W high-voltage DC power module |
|---|---|---|---|
| 11 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable transceiver modules and cables:<br>● FC optical module<br>● 10GE optical module<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 12 | Six 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 13 | Three port-side mounting holes for mounting brackets | 14 | Four middle mounting holes for mounting brackets |
| 15 | Four power-supply-side mounting holes for mounting brackets | - | - |

## CE6850U-24S2Q-HI

**Figure 3-17** Appearance of the CE6850U-24S2Q-HI



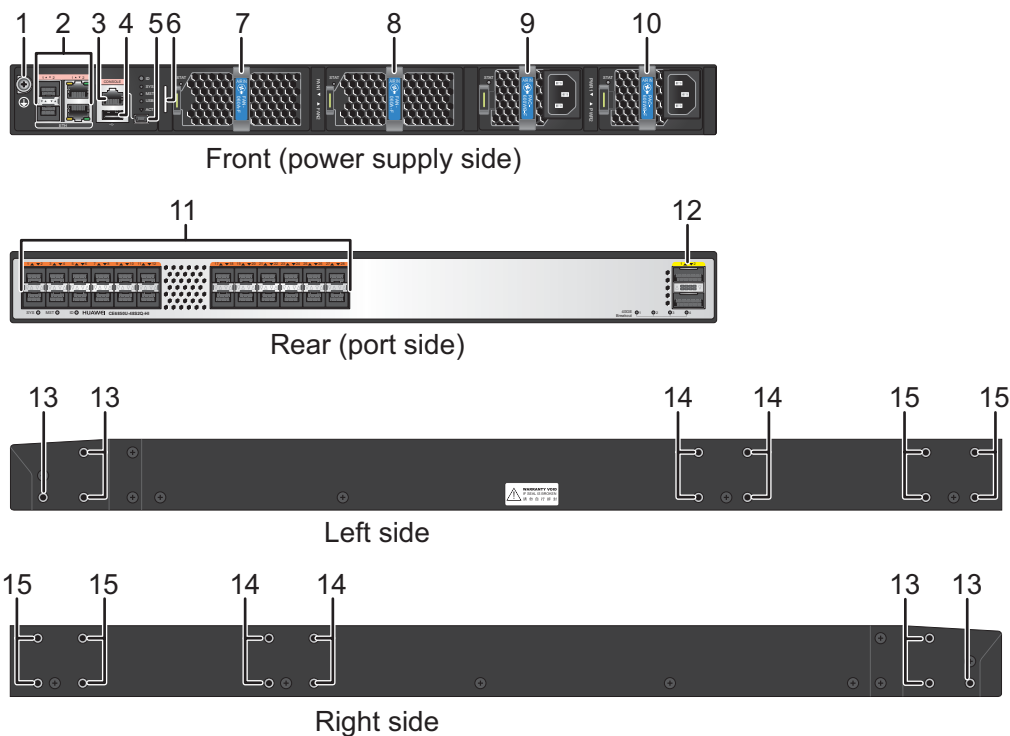| 1 | Ground screw | 2 | Two ETH management ports (combo) |
| --- | --- | --- | --- |
| | | | Applicable transceiver modules for the GE optical port of the combo port: |
| | | | ● FE optical module |
| | | | ● GE optical module |
| | | | **NOTE** |
| | | | The combo optical port uses a 100M or GE optical module and matching fibers. A 100M optical module can be used only after the switch starts successfully. |
| 3 | Console port | 4 | USB port |
| 5 | Mini USB port | 6 | Barcode label |
| | | | **NOTE** |
| | | | This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. |
| 7 | Fan slot 1 | 8 | Fan slot 2 |
| | Applicable fan modules: | | Applicable fan modules: |
| | ● FAN-060A series fan modules | | ● FAN-060A series fan modules |

| 9 | Power supply slot 1<br><br>Applicable power modules:<br><br>● 600 W AC&240 V DC power module<br><br>● 600 W high-voltage DC power module | 1 0 | Power supply slot 2<br><br>Applicable power modules:<br><br>● 600 W AC&240 V DC power module<br><br>● 600 W high-voltage DC power module |
|---|---|---|---|
| 11 | Twenty-four 10GE SFP+ Ethernet optical ports<br><br>Applicable transceiver modules and cables:<br><br>● FC optical module<br><br>● 10GE optical module<br><br>● GE optical module<br><br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br><br>● SFP+ AOC cable<br><br>● SFP+ copper cables | 1 2 | Two 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br><br>● 40GE optical module<br><br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br><br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br><br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br><br>● QSFP+ copper cables (QSFP+ to QSFP+) |
| 13 | Three port-side mounting holes for mounting brackets | 1 4 | Four middle mounting holes for mounting brackets |
| 15 | Four power-supply-side mounting holes for mounting brackets | - | - |

## CE6870-24S6CQ-EI

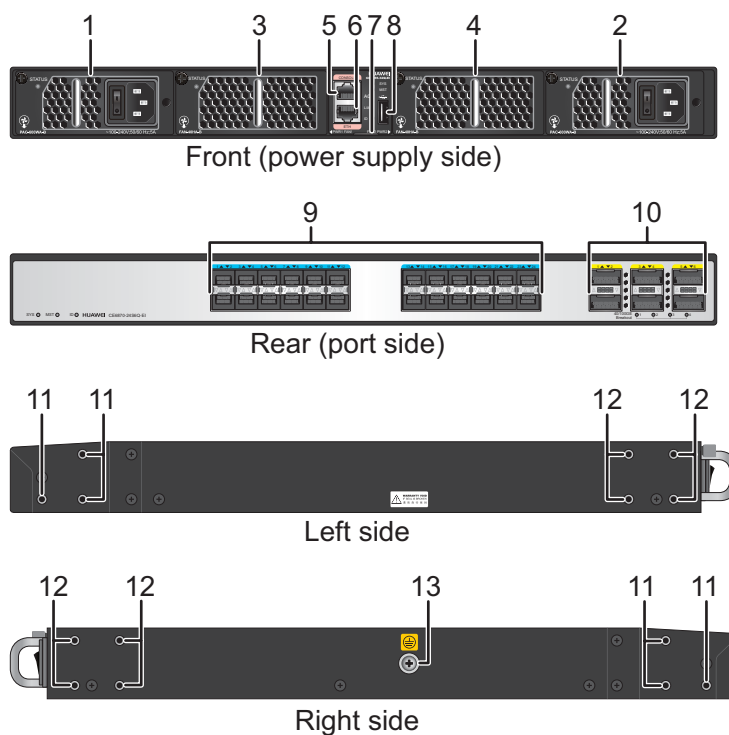Figure 3-18 Appearance of the CE6870-24S6CQ-EI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br> ● 350 W DC power module <br> ● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br> ● FAN-40HA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br> ● FAN-40HA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Twenty-four 10GE SFP+ Ethernet optical ports <br><br> Applicable modules and cables: <br><br> ● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported) <br> ● GE optical module <br> ● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s) <br> ● SFP+ AOC cable <br> ● SFP+ copper cables | 10 | Six 40GE/100GE QSFP28 Ethernet optical ports <br><br> **NOTE** <br><br> A QSFP28 Ethernet optical port can be split into four 10GE or 25GE ports. <br><br> Applicable modules and cables: <br><br> ● 40GE optical module <br> ● 100GE optical module <br> ● QSFP+ to QSFP+ AOC cable <br> ● QSFP+ to 4*SFP+ AOC cable <br> ● QSFP+ to 4*SFP+ high-speed cable <br> ● QSFP+ to QSFP+ high-speed cable <br> ● QSFP28 to QSFP28 high-speed cable <br> ● QSFP28 to 4*SFP28 high-speed cable |
|---|---|---|---|
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE6870-48S6CQ-EI

**Figure 3-19** Appearance of the CE6870-48S6CQ-EI
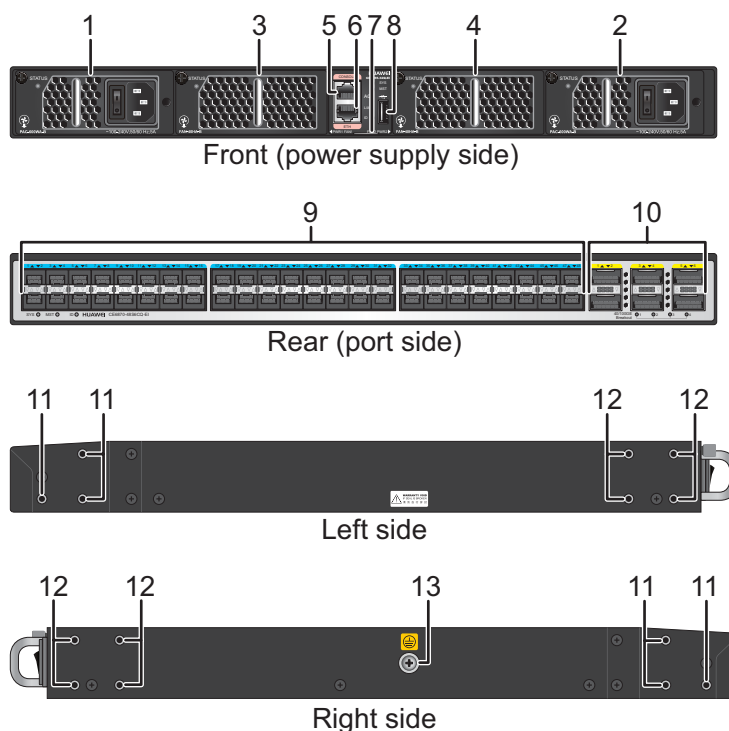
| 1 | Power supply slot 1<br><br>Applicable power modules:<br>● 350 W DC power module<br>● 600 W AC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br>● 350 W DC power module<br>● 600 W AC power module |
|---|---|---|---|
| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40HA series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40HA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Forty-eight 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables | 10 | Six 40GE/100GE QSFP28 Ethernet optical ports<br>**NOTE**<br>A QSFP28 Ethernet optical port can be split into four 10GE or 25GE ports.<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● 100GE optical module<br>● QSFP+ to QSFP+ AOC cable<br>● QSFP+ to 4*SFP+ AOC cable<br>● QSFP+ to 4*SFP+ high-speed cable<br>● QSFP+ to QSFP+ high-speed cable<br>● QSFP28 to QSFP28 high-speed cable<br>● QSFP28 to 4*SFP28 high-speed cable |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | - | - |

## CE5810-24T4S-EI

**Figure 3-20** Appearance of the CE5810-24T4S-EI



| 1 | Power supply slot 1 | 2 | Power supply slot 2 |
|---|---|---|---|
| | Applicable power modules: | | Applicable power modules: |
| | ● 150 W AC power module (PAC-150WA) | | ● 150 W AC power module (PAC-150WA) |
| | ● 350 W DC power module | | ● 350 W DC power module |
| 3 | Fan slot 1 | 4 | Fan slot 2 |
| | Applicable fan modules: | | Applicable fan modules: |
| | ● FAN-40SB series fan modules | | ● FAN-40SB series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>NOTE<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

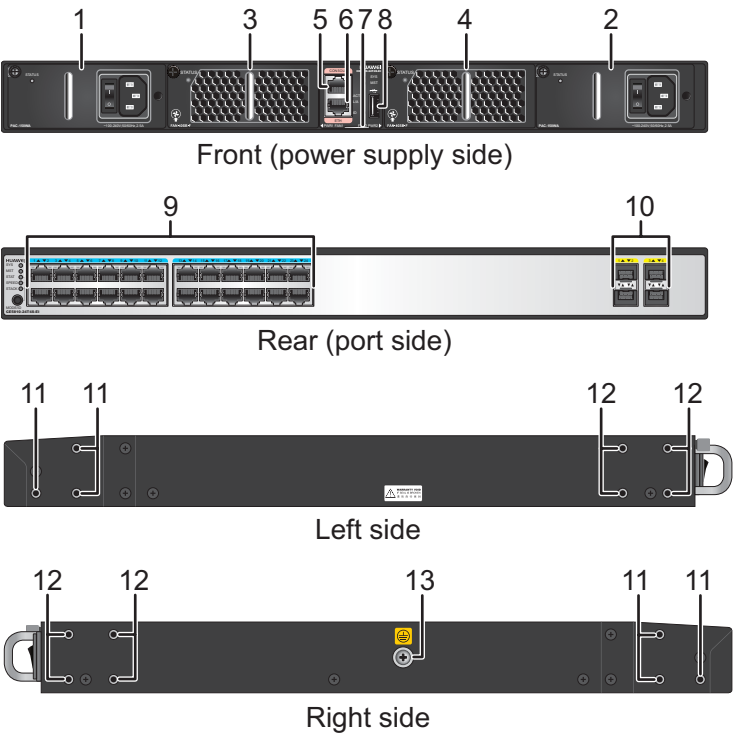| 9 | Twenty-four 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports<br><br>Applicable transceiver modules and cables:<br><br>● 10GE optical module<br>● GE optical module<br>● GE copper module (only works at 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables |
|---|---|---|---|
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | – | – |

## CE5810-48T4S-EI

Figure 3-21 Appearance of the CE5810-48T4S-EI



Front (power supply side)

Rear (port side)

Left side

Right side

| 1 | Power supply slot 1<br><br>Applicable power modules:<br><br>● 150 W AC power module (PAC-150WA)<br>● 350 W DC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br><br>● 150 W AC power module (PAC-150WA)<br>● 350 W DC power module |
|---|---|---|---|

| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-40SB series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-40SB series fan modules |
|---|---|---|---|
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |
| 9 | Forty-eight 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports<br><br>Applicable transceiver modules and cables:<br>● 10GE optical module<br>● GE optical module<br>● GE copper module (only works at 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables |
| 11 | Three port-side mounting holes for mounting brackets | 12 | Four power-supply-side mounting holes for mounting brackets |
| 13 | Ground screw | – | – |

### CE5850-48T4S2Q-EI

**Figure 3-22** Appearance of the CE5850-48T4S2Q-EI
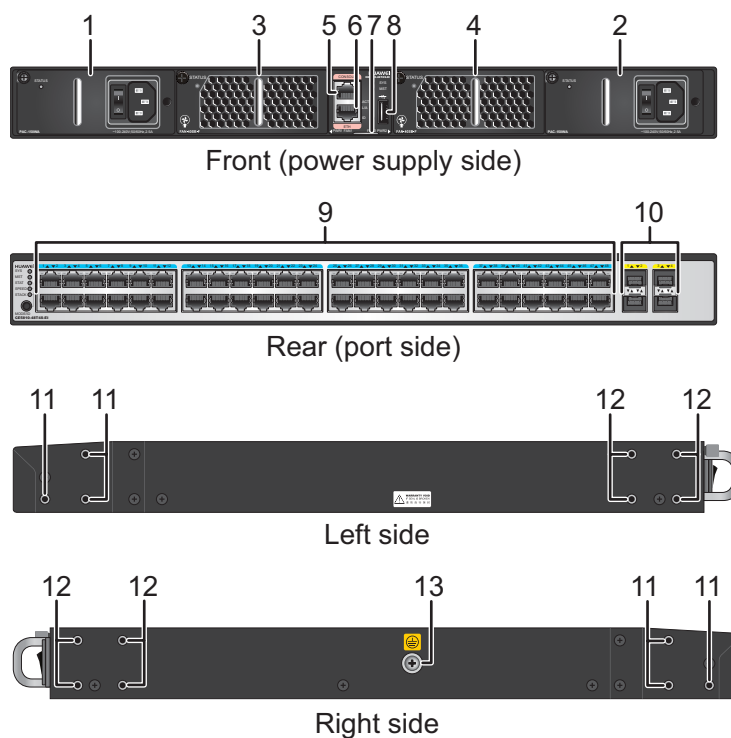


| 1 | Power supply slot 1 Applicable power modules: <br> ● 150 W AC power module (PAC-150WA) <br> ● 350 W DC power module | 2 | Power supply slot 2 Applicable power modules: <br> ● 150 W AC power module (PAC-150WA) <br> ● 350 W DC power module |
|---|---|---|---|
| 3 | Fan slot 1 Applicable fan modules: <br> ● FAN-40EA series fan modules | 4 | Fan slot 2 Applicable fan modules: <br> ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Forty-eight 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module<br><br>● GE optical module<br><br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br><br>● SFP+ AOC cable<br><br>● SFP+ copper cables |
|---|---|---|---|
| 11 | Two 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port cannot be split into four 10GE ports.<br><br>Applicable transceiver modules and cables:<br><br>● 40GE optical module<br><br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br><br>● QSFP+ copper cables (QSFP+ to QSFP+) | 12 | Three port-side mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE5850-48T4S2Q-HI

**Figure 3-23** Appearance of the CE5850-48T4S2Q-HI



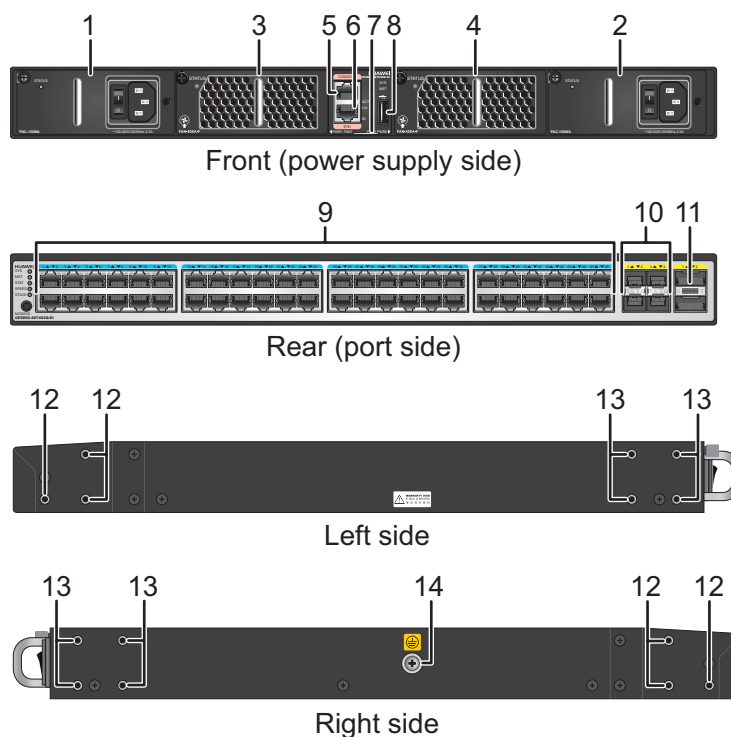| 1 | Power supply slot 1 <br><br> Applicable power modules: <br> ● 150 W AC power module (PAC-150WA) <br> ● 350 W DC power module | 2 | Power supply slot 2 <br><br> Applicable power modules: <br> ● 150 W AC power module (PAC-150WA) <br> ● 350 W DC power module |
|---|---|---|---|
| 3 | Fan slot 1 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules | 4 | Fan slot 2 <br><br> Applicable fan modules: <br> ● FAN-40EA series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label <br> **NOTE** <br> This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Forty-eight 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br><br>● 10GE optical module<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables |
| --- | --- | --- | --- |
| 11 | Two 40GE QSFP+ Ethernet optical ports<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports.<br><br>Applicable modules and cables:<br><br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP +)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP +)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+) | 12 | Three port-side mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## CE5855-48T4S2Q-EI

Figure 3-24 Appearance of the CE5855-48T4S2Q-EI



Front (power supply side)

Rear (port side)
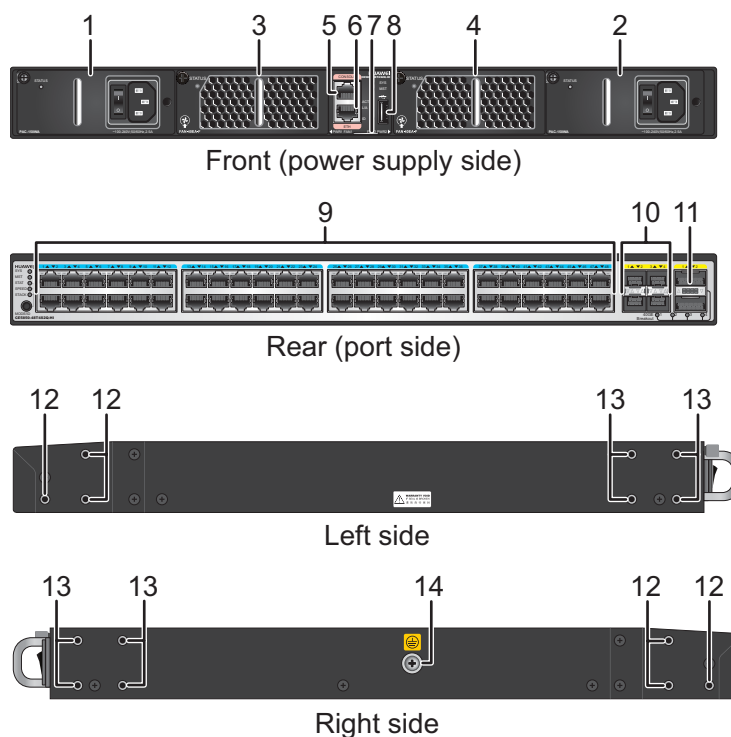
Left side

Right side

| 1 | Power supply slot 1<br><br>Applicable power modules:<br>● 150 W AC power module (ES0W2PSA0150)<br>● 350 W DC power module | 2 | Power supply slot 2<br><br>Applicable power modules:<br>● 150 W AC power module (ES0W2PSA0150)<br>● 350 W DC power module |
|---|---|---|---|
| 3 | Fan slot 1<br><br>Applicable fan modules:<br>● FAN-040A series fan modules | 4 | Fan slot 2<br><br>Applicable fan modules:<br>● FAN-040A series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label<br>**NOTE**<br>This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Forty-eight 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports |
|---|---|---|---|
| | | | Applicable modules and cables: |
| | | | ● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported) |
| | | | ● GE optical module |
| | | | ● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s) |
| | | | ● SFP+ AOC cable |
| | | | ● SFP+ copper cables |
| 11 | Two 40GE QSFP+ Ethernet optical ports | 12 | Three port-side mounting holes for mounting brackets |
| | Applicable modules and cables: | | |
| | ● 40GE optical module | | |
| | ● QSFP+ AOC cable (QSFP+ to QSFP+) | | |
| | ● QSFP+ AOC cable (QSFP+ to 4*SFP+) | | |
| | ● QSFP+ copper cables (QSFP+ to 4*SFP+) | | |
| | ● QSFP+ copper cables (QSFP+ to QSFP+) | | |
| | **NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports. | | |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

### CE5855-24T4S2Q-EI

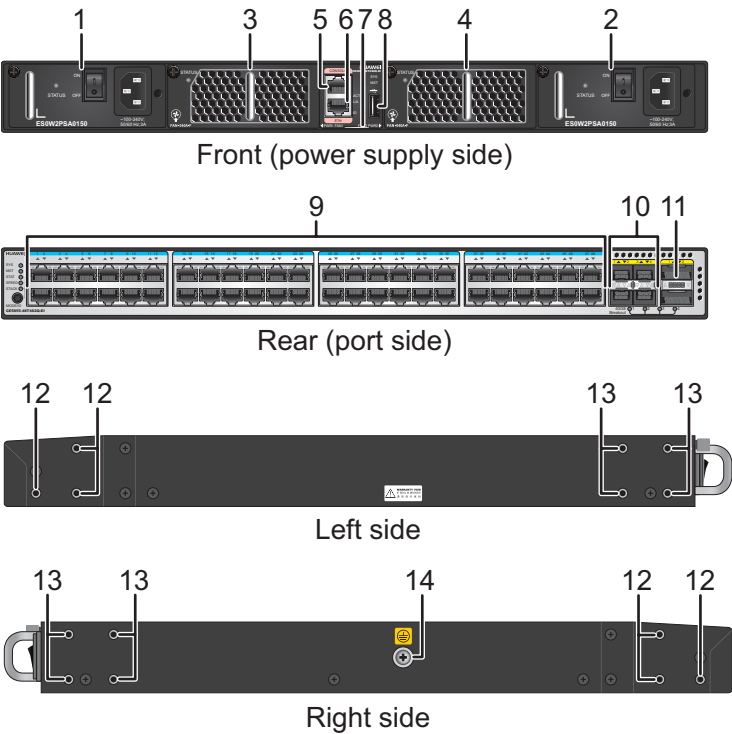**Figure 3-25** Appearance of the CE5855-24T4S2Q-EI



| 1 | Power supply slot 1 Applicable power modules: ● 150 W AC power module (ES0W2PSA0150) ● 350 W DC power module | 2 | Power supply slot 2 Applicable power modules: ● 150 W AC power module (ES0W2PSA0150) ● 350 W DC power module |
|---|---|---|---|
| 3 | Fan slot 1 Applicable fan modules: ● FAN-040A series fan modules | 4 | Fan slot 2 Applicable fan modules: ● FAN-040A series fan modules |
| 5 | Console port | 6 | ETH management port (RJ45) |
| 7 | Barcode label NOTE This label is drawable, and you can pull it outward to view the ESN barcode and MAC address of the switch. | 8 | USB port |

| 9 | Twenty-four 10/100/1000BASE-T Ethernet electrical ports | 10 | Four 10GE SFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 10GE optical module (OSXD22N00 and LE2MXSC80FF0 not supported)<br>● GE optical module<br>● GE copper module (works at 10 Mbit/s, 100 Mbit/s, or 1000 Mbit/s)<br>● SFP+ AOC cable<br>● SFP+ copper cables |
|----|----|----|----|
| 11 | Two 40GE QSFP+ Ethernet optical ports<br><br>Applicable modules and cables:<br>● 40GE optical module<br>● QSFP+ AOC cable (QSFP+ to QSFP+)<br>● QSFP+ AOC cable (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to 4*SFP+)<br>● QSFP+ copper cables (QSFP+ to QSFP+)<br>**NOTE**<br>A 40GE QSFP+ port can be split into four 10GE ports. | 12 | Three port-side mounting holes for mounting brackets |
| 13 | Four power-supply-side mounting holes for mounting brackets | 14 | Ground screw |

## Slot

● Power supply slot

The CE8800&7800&6800&5800 series switches have two power supply slots, in which power modules can be installed to provide power to the chassis. A chassis can have one or two power modules. Double power modules can provide a higher reliability.

The CE8800&7800&6800&5800 series switches support double power modules (1+1 backup).

– When both power modules are working properly, they equally provide power for a chassis.

– When one power module fails, the other one provides all power required for a chassis.

All power modules are hot swappable.

● Fan slot

The CE8800&7800&6800&5800 series switches have two fan slots, in which fan modules can be installed to cool the chassis, ensuring efficient heat dissipation and system stability. A chassis must have two working fan modules to ensure normal operating.

All fan modules are hot swappable.

## Airflow

The cooling systems of the CE8800&7800&6800&5800 series switches have front-to-back or back-to-front airflow depending on the airflow direction of the power modules and fan modules used.

The airflow direction of the power modules and fan modules required on the CE8800&7800&6800&5800 series switches depends on how the switches are installed in cabinets. Typically, cabinets in a data center have cold air flowing in from the front and hot air exhausted from the back. If CE8800&7800&6800&5800 series switches are installed with the power supply side facing the front, you are advised to use fan modules and power modules with front-to-back airflow in the switches.

📖**NOTE**

- Front-to-back airflow: The power modules and fan modules using front-to-back airflow are marked

   or . Air flows into the chassis from the power supply side and flows out from the port side, as shown in **Figure 3-26** (CE5800 as an example).

- Back-to-front airflow: The power modules and fan modules using back-to-front airflow are marked

   or . Air flows into the chassis from the port side and flows out from the power supply side, as shown in **Figure 3-27** (CE5800 as an example).

- When the power module and fan module use forcible heat dissipation, they must use the same airflow method. For example, if the power module with back-to-front airflow is used, the fan module with back-to-front airflow must be used.

- When the fanless 150 W AC power module is used, the fan module with either of the airflow methods can be used.

**Figure 3-26** Front-to-back airflow (air flows out from the port side)



Cold air

Hot air
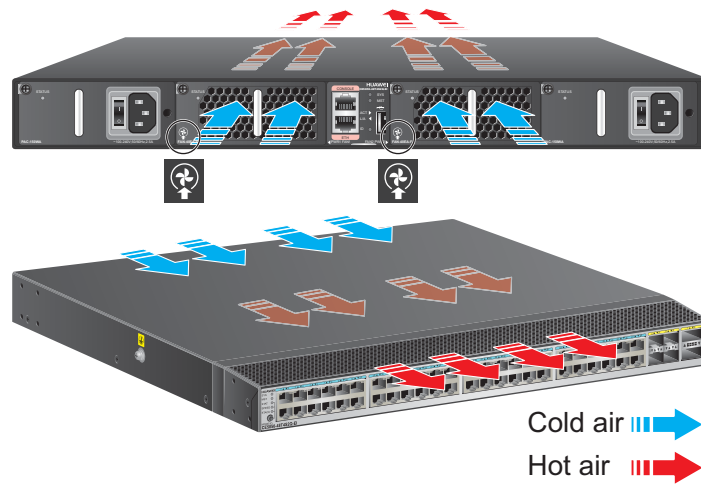
**Figure 3-27** Back-to-front airflow (air flows into from the port side)



Cold air

Hot air
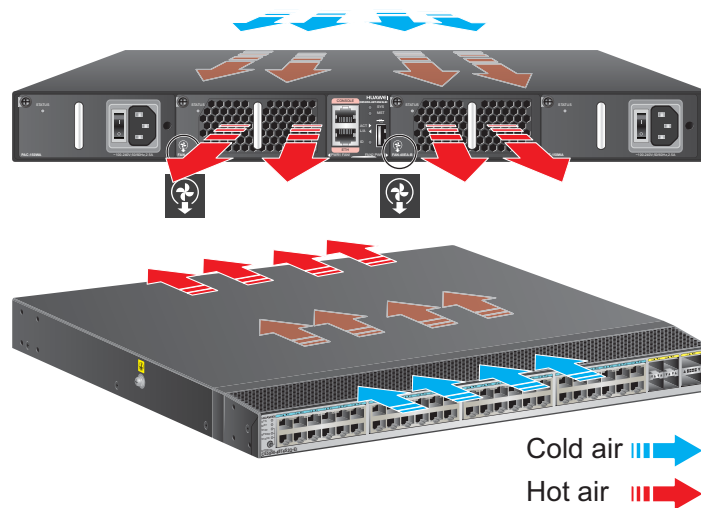
# 4 Product Features

## About This Chapter

# 4.1 Feature List

Table 4-1 lists the features supported by CE8800&7800&6800&5800 series switches.

**Table 4-1** Features supported by CE8800&7800&6800&5800 series switches

| Feature | | Description | Difference |
|---------|---|-------------|------------|
| Ethe rnet | Ethern et | ● Operating modes of full-duplex and auto-negotiation<br><br>● Operating rates of an Ethernet interface, including 10 Mbit/s, 100 Mbit/s, 1000 Mbit/s, 10 Gbit/s, 25Gbit/s, 40 Gbit/s, 100Gbit/s, and auto-negotiation<br><br>**NOTE**<br>   ● GE electrical interfaces support the operating rates of 10 Mbit/s, 100 Mbit/s, and 1000 Mbit/s.<br>   ● 10GE electrical interfaces support the operating rates of 100 Mbit/s, 1000 Mbit/s, and 10 Gbit/s.<br>   ● 10GE optical interfaces support the operating rates of 1000 Mbit/s and 10 Gbit/s.<br>   ● 25GE optical interfaces support the operating rates of 10000 Mbit/s and 25 Gbit/s.<br>   ● 40GE optical interfaces support only the operating rate of 40 Gbit/s.<br>   ● 100GE optical interfaces support the operating rates of 40 Gbit/s and 100 Gbit/s.<br><br>● Traffic suppression and storm suppression<br><br>● Jumbo frames<br><br>● Configuration of the minimum jumbo frame length<br><br>● Link aggregation<br><br>● Load balancing among links within a trunk<br><br>● Interface isolation and forwarding restrictions<br><br>● 40GE interface split<br><br>● Aggregating 10GE optical interfaces into a 40GE interface<br><br>● Protocol-based packet statistics collection on an interface | In V100R005C10 and later versions, CE6810LI supports switching to Layer 3 interface mode, and if a CE6810LI functions as a standalone switch or a leaf switch in an SVF system consisting of fixed and modular switches, the CE6810LI does not support sub-interfaces. If a CE6810LI functions as a leaf switch in an SVF system consisting of fixed switches, the CE6810LI supports sub-interfaces. |

| Feature | | Description | Difference |
|---|---|---|---|
| | Virtual Local Area Network (VLAN) | • Access modes of access, trunk, hybrid, and QinQ<br>• Assigning a LAN to VLANs<br>• VLAN aggregation<br>• MUX VLAN<br>• Transparent Transmission of Protocol Packets in a VLAN<br>• Batch configuration of multiple VLANs | In V100R005C10 and later versions, CE6810LI supports VLAN aggregation. |
| | QinQ | • Basic QinQ<br>• Selective QinQ | None |
| | VLAN Mapping | • 1 to 1 VLAN mapping.<br>• 2 to 1 VLAN mapping.<br>• 2 to 2 VLAN mapping. | None |
| | GVRP | GVRP | None |
| | Media Access Control (MAC) | • Automatic learning and aging of MAC addresses<br>• Static, dynamic, and blackhole MAC address entries<br>• Packet filtering based on source MAC addresses<br>• Interface-based MAC learning limiting | None |
| | Link Layer Discovery Protocol (LLDP) | Support for LLDP | None |

| Feature | | Description | Difference |
|---|---|---|---|
| Ethernet loop protection | Multiple Spanning Tree Protocol (MSTP) | <ul><li>Spanning Tree Protocol (STP)</li><li>Rapid Spanning Tree Protocol (RSTP)</li><li>MSTP</li><li>VBST</li><li>Bridge protocol data unit (BPDU) protection, root protection, and loop protection</li><li>Partitioned STP and Layer 2 protocol transparent transmission</li></ul> | None |
| | ERPS | G.8032 v1/v2 | None |
| IP features | Address Resolution Protocol (ARP) | <ul><li>Static and dynamic ARP entries</li><li>Applying ARP in a VLAN</li><li>Aging ARP entries</li><li>Gratuitous ARP</li><li>Proxy ARP</li><li>ARP-Ping</li><li>Fast ARP reply</li><li>ARP Gateway Anti-Collision</li><li>Disabling Learning of ARP Entries on Different Network Segments</li></ul> | None |
| | IPv6 | <ul><li>IPv4/IPv6 dual-stack</li><li>Neighbor Discovery (ND)</li><li>IPv6 over IPv4 Manual Tunnel</li><li>IPv6 over IPv4 GRE Tunnel</li><li>6to4 Tunnel</li></ul> | The CE5855EI does not support IPv6. However, interfaces on a CE5855EI provide the IPv6 capability when the switch functions as a leaf switch in an SVF system and the SVF forwarding mode is set to centralized or hybrid. |
| | Dynamic Host Configuration Protocol (DHCP) | <ul><li>DHCP server</li><li>DHCP relay</li><li>DHCPv6 Relay</li><li>DHCP snooping</li></ul> | None |

| Feature | | Description | Difference |
|---|---|---|---|
| IP forwarding | Unicast routing | <ul><li>IPv4 and IPv6 static routes</li><li>RIPv1, RIPv2 and RIPng</li><li>OSPFv2 and OSPFv3</li><li>IS-IS (IPv4) and IS-IS (IPv6)</li><li>BGP and BGP4+</li><li>Routing policy</li><li>Policy-based routing</li></ul> | CE6810LI series supports unicast routing in V100R005C10 and later versions.<br><br>CE6810LI does not support routing multi-instance.<br><br>CE6810LI does not support IPv6 unicast routing.<br><br>Interfaces on a CE5855EI provide the IPv6 capability and support IPv6 MCE when the switch functions as a leaf switch in an SVF system and the SVF forwarding mode is set to centralized or hybrid. |
| | MPLS | <ul><li>LDP</li><li>MPLS QoS: uniform mode, pipe mode, short pipe mode</li></ul> | Only CE8860EI, CE7855EI, CE7850EI, CE6870EI, CE6850U-HI, CE6851HI, CE6850HI, and CE6855HI switches support MPLS. |
| | VPN | <ul><li>MCE (Multi-VPN-Instance CE) and IPv6 MCE</li><li>GRE</li></ul> | CE6810LI does not support VPN.<br><br>CE5855EI does not support GRE.<br><br>Interfaces on a CE5855EI provide the IPv6 capability and support IPv6 MCE when the switch functions as a leaf switch in an SVF system and the SVF forwarding mode is set to centralized or hybrid. |
| | Layer 3 IP multicast | <ul><li>IGMPv1, IGMPv2, and IGMPv3</li><li>IGMP SSM mapping</li><li>MLDv1 and MLDv2</li><li>MLD SSM mapping</li><li>PIM-DM (IPv4)</li><li>PIM-SM (IPv4) and PIM-SM (IPv6)</li><li>PIM-SSM (IPv4) and PIM-SSM (IPv6)</li><li>Bidirectional PIM (IPv4) and Bidirectional PIM (IPv6)</li><li>MSDP</li><li>Multicast routing policy</li><li>RPF check</li></ul> | CE6810LI does not support Layer 3 IP multicast features. A standalone CE5855EI switch supports only IPv4 Layer 3 multicast features and does not support IPv6 Layer 3 multicast features. When a CE5855EI switch acts as a leaf switch in an SVF system, its interfaces have IPv6 capability. |

| Feature | | Description | Difference |
|---------|---|-------------|------------|
| Device reliability | Bidirectional Forwarding Detection (BFD) | <ul><li>BFD (IPv4) and BFD (IPv6)</li><li>Association between BFD and Eth-Trunk</li><li>BFD for OSPF</li><li>BFD for OSPFV3</li><li>BFD for IS-IS</li><li>BFD for IS-IS IPV6</li><li>BFD for BGP</li><li>BFD for BGP4+</li><li>BFD for PIM (IPv4)</li><li>BFD for PIM (IPv6)</li><li>BFD for static routing (IPv4)</li><li>BFD for static routing (IPv6)</li><li>BFD for VRRP</li><li>BFD for VRRP6</li><li>BFD for LDP LSP</li></ul> | CE6810LI only supports multicast BFD function. |
| | Others | <ul><li>Virtual Router Redundancy Protocol (VRRP) and VRRP6</li><li>Device Link Detection Protocol (DLDP)</li><li>Smart Link</li><li>Ethernet in the First Mile (EFM), defined in 802.3ah</li></ul> | None |
| Layer 2 IP multicast features | Layer 2 IP multicast | <ul><li>IGMP snooping</li><li>IGMP snooping proxy</li><li>Fast leave</li><li>Multicast traffic control</li><li>Multicast VLAN</li></ul> | The CE6810LI series does not support multicast VLAN. |

| Feature | | Description | Difference |
|---|---|---|---|
| QoS features | Traffic classification | • Traffic classification based on combination of the L2 protocol header, IP 5-tuple, outbound interface, and 802.1p priority<br>• Traffic classification based on the C-VID and C-PRI of QinQ packets<br>• Matching internal packet information encapsulated in a GRE tunnel<br>• Matching internal packet information encapsulated in an MPLS or VXLAN tunnel<br>• Matching internal packet information encapsulated in a TRILL tunnel | None |
| | Traffic behavior | • Access control after traffic classification<br>• Traffic policing based on traffic classifiers<br>• Re-marking based on the traffic classification result<br>• Class-based packet queuing<br>• Packet redirection after traffic classification<br>• Association between traffic classifiers and traffic behaviors | None |
| | Priority mapping | • Mapping from 802.1p priorities to PHBs and colors<br>• Mapping from PHBs and colors to 802.1p priorities<br>• Mapping from DSCP priorities to PHBs and colors<br>• Mapping from PHBs and colors to DSCP priorities<br>• Mapping from MPLS EXP priorities to PHBs and colors | None |

| Feature | | Description | Difference |
|---|---|---|---|
| | Queue scheduling | <ul><li>Priority queuing (PQ) scheduling</li><li>Deficit round robin (DRR) scheduling</li><li>PQ+DRR scheduling</li><li>Weighted round robin (WRR) scheduling</li><li>PQ+WRR scheduling</li></ul> | None |
| | Congestion avoidance | <ul><li>Tail-Drop</li><li>Weighted Random Early Detection (WRED)</li></ul> | None |
| | Rate limiting on outbound interfaces | Rate limiting on outbound interfaces | None |
| | Congestion monitoring and analysis | Queue-based congestion monitoring and analysis | This function is only supported by CE8860EI. |
| | ACL-based simplified traffic policy | <ul><li>ACL-based packet filtering</li><li>ACL-based traffic statistics collection</li><li>ACL-based redirection</li></ul> | None |
| Virtualization | Many-to-one virtualization | <ul><li>Intelligent Stack (iStack)</li><li>Stack split and merge</li><li>Dual-active detection</li><li>Version and configuration synchronization</li><li>Super virtual fabric (SVF)</li></ul> | None |

| Feature | | Description | Difference |
|---|---|---|---|
| Data center features | Transparent Interconnection of Lots of Links (TRILL) | • TRILL features<br>• TRILL NSR<br>• TRILL ECMP<br>• IGMP over TRILL<br>• TRILL multi-homing active-active<br>• Association between TRILL and MSTP<br>• TRILL gateway | CE5810 and CE6810LI do not support TRILL. |
| | Fiber channel over Ethernet (FCoE) | • FCF<br>• NPV<br>• FSB<br>• FC interfaces | The CE6810LI does not support FCF and NPV.<br>Only CE6850U-HI supports FC interfaces.<br>The CE5800 does not support FCoE. |
| | Data Center Bridging (DCB) | • Data Center Bridging Exchange Protocol (DCBX)<br>• Priority-based Flow Control (PFC)<br>• Enhanced Transmission Selection (ETS) | The CE8860EI does not support ETS.<br>The CE6810LI does not support ETS.<br>The CE5800 does not support DCB. |
| | Virtual awareness & server association | • Virtual awareness<br>• Automatic policy deployment<br>• Automatic policy migration<br>• Cluster of NLB servers<br>  – Association between virtual IP addresses of NLBs and multicast MAC addresses<br>  – Association between one multicast MAC address and multiple outbound interfaces | None |

| Feature | | Description | Difference |
|---------|---------|-------------|------------|
| | VXL AN | <ul><li>The SDN controller can use the OpenFlow protocol to deliver VXLAN information to a forwarder. The CE switch functions as the forwarder.</li><li>The AC uses NetConf to control VXLAN tunnel setup and uses OpenFlow to control packet forwarding in a tunnel. The CE functions as the forwarder.</li><li>Configuring a VXLAN tunnel on a CE switch manually</li><li>Configuring a VXLAN tunnel on a CE switch dynamically using BGP EVPN.</li></ul> | Only CE8860EI, CE7855EI, CE7850EI, CE6870EI, CE6850U-HI, CE6851HI, CE6850HI, and CE6855HI switches support VXLAN. |
| | Forwa rding mode based on the Virtual Ethern et Port Aggre gator (VEP A) | Forwarding mode based on the VEPA | None |
| Conf igura tion and main tena nce | Termi nal servic e | <ul><li>Command line configuration</li><li>Error messages and online help in English and Chinese</li><li>Login through console and Telnet terminals</li><li>Send function and data communications between terminal users</li></ul> | None |
| | File syste m | <ul><li>Directory and file management</li><li>File upload and download using File Transfer Protocol (FTP) and Trivial File Transfer Protocol (TFTP)</li></ul> | None |

| Feature | | Description | Difference |
|---------|---|-------------|------------|
| | Debugging and maintenance | • Unified management of logs, alarms, and debugging information<br>• Electronic labels<br>• User operation logs<br>• Detailed debugging information for network fault diagnosis<br>• Network test tools such as tracert and ping commands<br>• Port mirroring and traffic mirroring (remote mirroring supported) | None |
| | Version upgrade | • Device software loading and in-service software loading<br>• In-service upgrade using the basic input/output system (BIOS) menu<br>• In-service patching<br>• ZTP | None |

| Feature | | Description | Difference |
|---|---|---|---|
| Security and management | System security | • Hierarchical command-line protection based on user levels, preventing unauthorized users from using commands to access CE8800&7800&6800&5800 series switches<br><br>• Secure Shell (SSH)<br><br>• RADIUS (IPv4) and RADIUS (IPv6) authentication for login users<br><br>• HWTACACS (IPv4) and HWTACACS (IPv6) authentication for login users<br><br>• Access control list (ACL) filtering<br><br>• Dynamic ARP inspection (DAI)<br><br>• DHCP packet filtering (appending the Option 82 field)<br><br>• Local Attack Defense<br><br>• Attack defense<br>  – Defense against flood attacks without IP payloads, attacks from IGMP null payload packets, LAND attacks, Smurf attacks, and attacks from packets with invalid TCP flag bits<br>  – Defense against attacks from many fragments, attacks from many packets with offsets, attacks from repeated packet fragments, Tear Drop attacks, Syndrop attacks, NewTear attacks, Bonk attacks, Nesta attacks Rose attacks, Fawx attacks, Ping of Death attacks, and Jolt attacks<br>  – Defense against TCP SYN flood attacks, UDP flood attacks (including Fraggle attacks and UDP diagnosis port attacks), and ICMP flood attacks<br><br>• Logs about attacking MAC addresses<br><br>• URPF | None |

| Feature | | Description | Difference |
|---|---|---|---|
| | | ● 802.1x authentication | |
| | Network management | ● ICMP-based ping and tracert<br>● Simple Network Management Protocol Version 1/2c/3 (SNMPv1/v2c/v3)<br>● Standard management information base (MIB)<br>● Remote network monitoring (RMON)<br>● NETCONF interfaces<br>● OpenFlow Agent<br>● NetStream, with output statistics packets in the V5, V8, or V9 format<br>● NetStream Top Talkers<br>● sFlow<br>● Network quality analysis<br>● Packet trace | Only CE8860EI, CE7855EI, CE7850EI, CE6870EI, CE6855HI, CE6851HI, CE6850HI, and CE6850U-HI switches support OpenFlow Agent.<br>Only CE8860EI supports Packet trace. |

# 4.2 Key Features

## 4.2.1 Data Center Features

### TRILL

In the cloud computing era, a data center usually uses a distributed architecture for mass data storage, query, and search services. In this architecture, cluster computing between servers generates heavy east-west traffic. As virtualization technologies are widely used in cluster computing, each server needs to compute much more data than before, and therefore throughput of a physical server increases by multiple times. In addition, virtual machines (VMs) must be able to dynamically migrate within a data center, to improve service reliability, reduce costs of IT services and network operation and maintenance, and allow for more flexible service deployment.

Because of these characteristics of cloud-computing data centers, the traditional hierarchical network structure with Layer 2 access (xSTP) and Layer 3 aggregation/core (routing) cannot satisfy requirements of data centers. Currently, a large Layer 2 fat tree architecture is widely used in data centers. TRILL helps build a non-blocking large Layer 2 network that supports smooth VM migration and can adapt to increasing network scales. The following table describes the advantages of a TRILL network over a traditional network using xSTP and Layer 3 routing protocols.

**Table 4-2** Comparison between TRILL and xSTP networks

| Requirements of Cloud Computing Data Center Networks | Description | TRILL Network | xSTP Network |
|---|---|---|---|
| Smooth VM migration | As one of core cloud computing technologies, server virtualization has been widely used. To maximize service reliability, reduce costs of IT services and network operation and maintenance, and allow flexible service deployment in a data center, VMs must be able to dynamically migrate within the data center but not just on an aggregation or access switch. | Deployed on a large Layer 2 network, TRILL supports dynamic VM migration in the entire data center. | In a traditional network with Layer 2 xSTP access and Layer 3 IP routing, the IP address of a VM will change if the VM migrates to another network segment. Therefore, VMs can only migrate within the same network segment. |
| Non-blocking, low-delay data forwarding | In a cloud-computing data center, most of traffic is east-west traffic, which is different from the traffic model on traditional carrier networks. Non-blocking, low-delay forwarding is required on data center networks to ensure normal service operation. | On a TRILL network, each device uses the shortest path tree (SPT) algorithm to calculate the shortest paths from itself to all the other nodes. If multiple equal-cost links are available, load balancing can be implemented among the unicast forwarding entries. Load balancing among equal-cost paths fully uses network bandwidth and implements line-speed forwarding on each node. | Redundant links are blocked and traffic is forwarded over a single path, which greatly wastes bandwidth and hinders construction of a non-blocking network. |

| Requirements of Cloud Computing Data Center Networks | Description | TRILL Network | xSTP Network |
|---|---|---|---|
| Large network scale | In the cloud computing era, a large data center may need to support as many as millions of servers. To implement non-blocking forwarding, hundreds or thousands of switches must be deployed on the data center network, and therefore loop prevention protocols are required. When a network node or link fails, fast network convergence must be triggered to quickly restore services. In addition, network maintenance must be simple enough to facilitate service deployment. | • Network scale: supports about 1000 switches theoretically.<br>• Loop prevention: uses loop-free IS-IS on the control plane, so no loop exists.<br>• Convergence rate: uses the IS-IS routing protocol to generate forwarding entries. Moreover, a TRILL header contains the Hop-Count field to allow temporary loops in a short period. These features implement subsecond convergence.<br>• Network maintenance: requires only simple configuration. Many parameters such as nickname and system ID can be automatically generated, and most protocol parameters can retain their default values. You only need to maintain one protocol (TRILL) instead of managing unicast and multicast protocols separately. | • Network scale: supports only about 100 devices because the network diameter cannot exceed 7 hops.<br>• Loop prevention: blocks redundant ports to eliminate rings.<br>• Convergence rate: completes convergence in seconds, due to limitations of the convergence mechanism.<br>• Network maintenance: requires a heavy workload because multiple routing protocols such as IGP and PIM must be maintained on the network. |

| Requirements of Cloud Computing Data Center Networks | Description | TRILL Network | xSTP Network |
|---|---|---|---|
| Multitenant | In the cloud computing era, a physical data center is shared by multiple tenants. Each tenant has a virtual data center instance, enabling tenants to exclusively use the server, storage, and network resources in the respective instances, while isolating data traffic of different tenant. | Currently, TRILL uses VLAN IDs to identify tenants and isolates traffic of tenants by VLANs. In the early stage of the cloud computing industry and large Layer 2 network operation, the limit of 4096 VLAN IDs will not become a bottleneck. Later, TRILL will use the FineLabel field to identify tenants. The FineLabel field is 24 bits and can support a maximum of 16M tenants, meeting requirements for future increase of tenants. | Only a maximum of 4096 tenants are supported, and the capacity cannot be expanded. |
| Scalability | Data center networks must have high scalability to adapt to fast development of data centers. | A traditional xSTP-based Layer 2 network can be seamlessly connected to a TRILL-based large Layer 2 network. TRILL allows large network scales, fast convergence rates, and high scalability. | The network has small scale, slow convergence rate, and low scalability. |

## FCOE

As shown in **Figure 4-1**, the local area network (LAN) and storage area network (SAN) of a traditional data center are deployed and maintained independently. The LAN transmits services between servers and between servers and clients, and the SAN transmits services between servers and storage devices.

As data centers develop rapidly and increasing servers are deployed, independent deployment of LANs and SANs results in the following problems:

- Complex network: Service deployment is inflexible, network expansion is difficult, and network maintenance and management costs are high.

- Low energy efficiency: Each server is configured with at least 4 to 6 network adapters, including network interface cards (NICs) connected to LANs and host bus adapters

(HBAs) connected to SANs. Such settings increase power consumption and cooling costs.

**Figure 4-1** Before and after data center network convergence
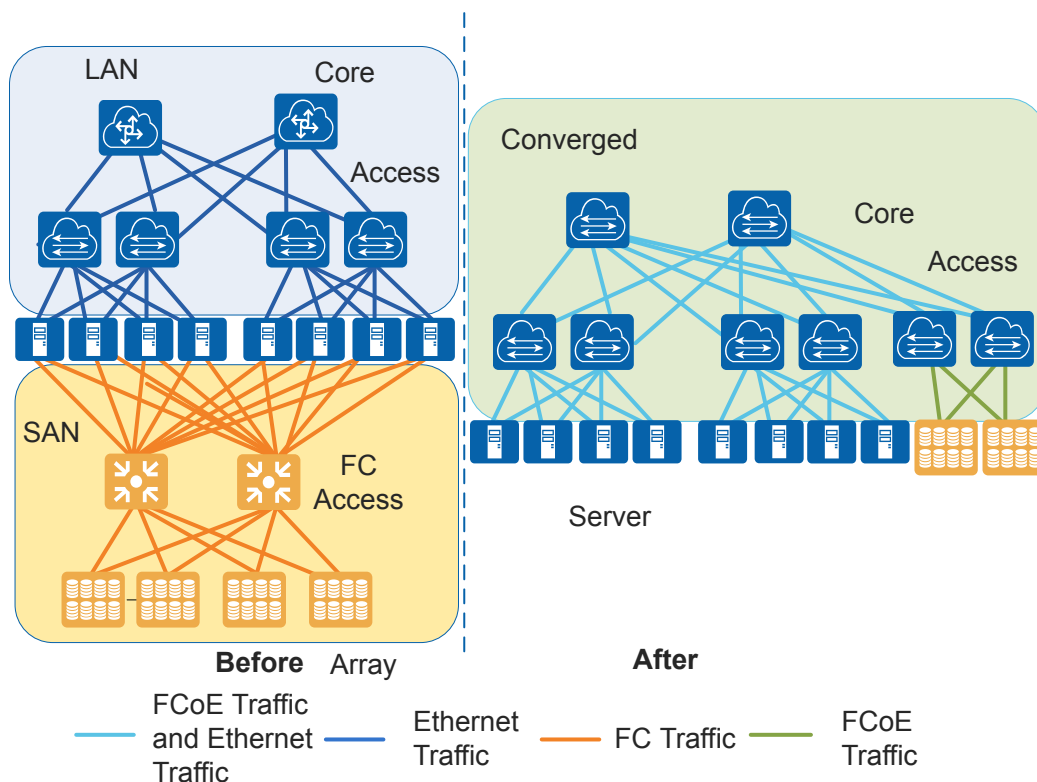


After the LAN and SAN are converged, the SAN and Ethernet LAN share the same integrated network infrastructure, simplifying network infrastructure.

Fiber Channel over Ethernet (FCoE) is used for network convergence.

## DCB

On a converged data center network, LAN traffic, storage area network (SAN) traffic, and inter-process communication (IPC) traffic have different QoS requirements:

- SAN traffic is sensitive to packet loss and relies on in-order delivery, which means that packets are delivered in the same order in which they were sent.
- LAN traffic allows packet loss and is delivered on a best-effort (BE) basis.
- IPC traffic is exchanged between servers and requires low latency.

A converged network has high requirements for link sharing and common Ethernet cannot meet the preceding requirements.

Data Center Bridging (DCB) is a set of extensions to Ethernet for use in a data center environment, which is defined by the IEEE 802.1 working group. DCB is used to build lossless Ethernet, meeting QoS requirements on a converged data center network.

## Virtualization Perception

Virtualization and cloud computing are two development trends of data centers. Currently, the average usage of a data center is only 20% to 30%, the usage of PCs is 9%, and the CPU

usage of 90% servers is lower than 10% during their 90% operating time. Server virtualization was then developed to improve the server resource use efficiency.

Server virtualization isolates programs that run on different operating systems (OSs) of the same device and prevents resource conflicts.

As a key cloud computing technology, server virtualization reduces IT costs, improves service deployment flexibility, reduces operation and maintenance (OM) expenditure. Server virtualization has been widely deployed owing to these strengths.

Server virtualization unites storage, network, and security technologies and brings great challenges to data center network deployment and management.

- After server virtualization is deployed, an end-to-end (E2E) solution is required to manage physical and virtual networks.

- The partitioning of a physical server into smaller virtual machines (VMs) causes the partitioning of a physical interface into virtual service interfaces (VSIs). VM migration causes interface attribute migration.

- Unlike a network switch, a virtual switch cannot be accessed by a network administrator and needs to be managed using different tools. There is no unified NMS that can manage the tools. As a result, it is difficult to obtain the entire network topology.

- Server virtualization creates a virtual network based on a physical network. Hence, it is difficult to implement unified network and security policies.

The virtualization perception management plane detects virtual environment changes and unifies software differences to automatically update physical network configurations.

The virtualization perception solution is an E2E solution used to manage physical and virtual networks.

- The virtualization perception unifies server virtualization software differences and uses VSIs to manage network interfaces.

- Virtualization perception helps to dynamically obtain the topologies of physical and virtual networks.

- The virtualization perception solution provides network security policies, such as access control lists (ACLs) and quality of service (QoS) policies.

## VXLAN

Server virtualization is a critical cloud computing technology, and has been widely deployed because it significantly reduces IT and operation and maintenance (O&M) costs and facilitates more flexible service deployment.

**Figure 4-2** Server virtualization networking
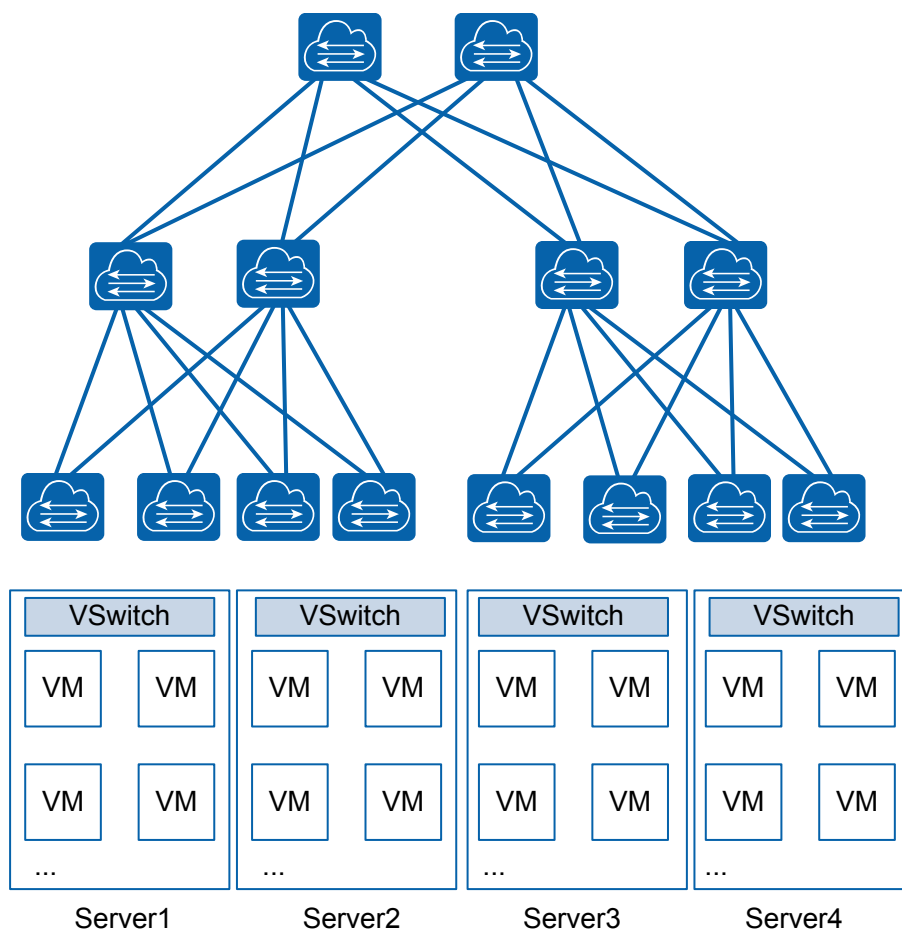


On the network shown in **Figure 4-2**, one server is virtualized into multiple virtual machines (VMs), each of which acts as a host. However, the exponential increase in the number of hosts leads to the following problems on a virtual network:

- The number of VMs is limited by network performance.

  On a large Layer 2 network, data packets are forwarded based on MAC address entries. Therefore, the number of VMs supported on the network depends on the MAC address table size.

- Network isolation capabilities are limited.

  Most networks use VLANs or virtual private networks (VPNs) for network isolation. However, these two network isolation technologies have the following limitations on large-scale virtualized networks:

  - The VLAN tag field, as defined in IEEE 802.1Q, has only 12 bits, and can only identify a maximum of 4096 VLANs, making it insufficient for identifying users on large Layer 2 networks.

  - VLANs or VPNs cannot support dynamic network adjustment on traditional Layer 2 networks.

- VM migration scope is limited by the network architecture.

  After VMs are started, they may need to be migrated from one server to another due to server resource problems (for example, CPU overload or insufficient memory). To

ensure uninterrupted services during VM migration, the IP and MAC addresses of VMs must remain unchanged. To meet this requirement, the service network must be a Layer 2 network that provides multipath redundancy and reliability.

VXLAN is a Network Virtualization over Layer 3 (NVo3) technology that uses MAC in User Datagram Protocol (MAC-in-UDP) to encapsulate packets. VXLAN addresses the above problems on large Layer 2 networks as follows:

- VM scale limitations imposed by network performance

  VXLAN encapsulates data packets sent from VMs into UDP packets and encapsulates IP and MAC addresses used on the physical network into outer headers. The network is only aware of the encapsulated parameters. This greatly reduces the number of MAC address entries required on large Layer 2 networks.

- Limited network isolation capabilities

  VXLAN uses a VXLAN network identifier (VNI) field similar to the VLAN ID field defined in IEEE 802.1Q. The VNI field has 24 bits and can identify a maximum of 16M VXLAN segments.

- VM migration scope limitations imposed by network architecture

  When VXLAN is used to construct a large Layer 2 network, VM IP and MAC addresses can remain unchanged after VM migration.

## 4.2.2 Device Virtualization

### SVF

In the traditional access layer networking used in data centers, servers connect to the network through box switches, as shown in **Figure 4-3**. As the network size expands, more network devices are deployed. Network management becomes a critical issue in data center infrastructure management. Additionally, large-scale modern data centers require that access switches provide higher port densities for servers.

**Figure 4-3** Traditional data center access layer networking
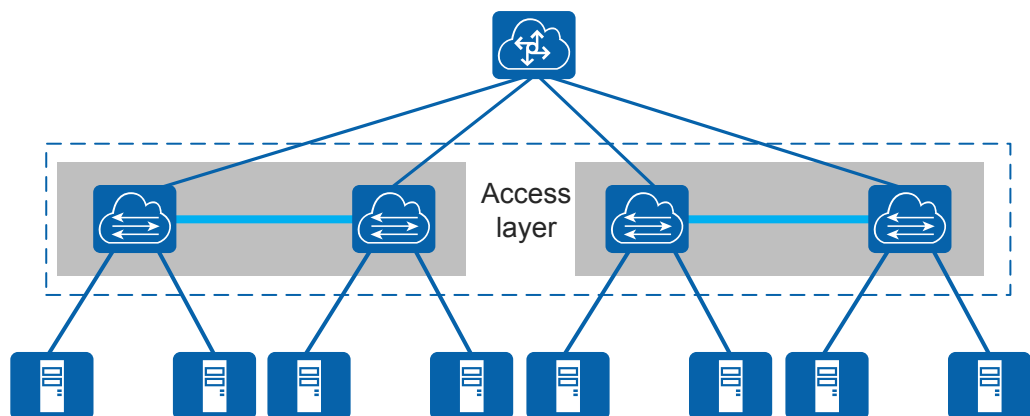


Super virtual fabric (SVF) is a vertical virtualization technology that allows low-cost fixed-configuration switches to act as remote interface cards for a parent switch. This technology increases the port density of the parent switch and facilitates centralized switch management, allowing for high-density access and simple management in data centers. **Figure 4-4** shows SVF networking at the data center access layer.

**Figure 4-4** SVF networking at the data center access layer
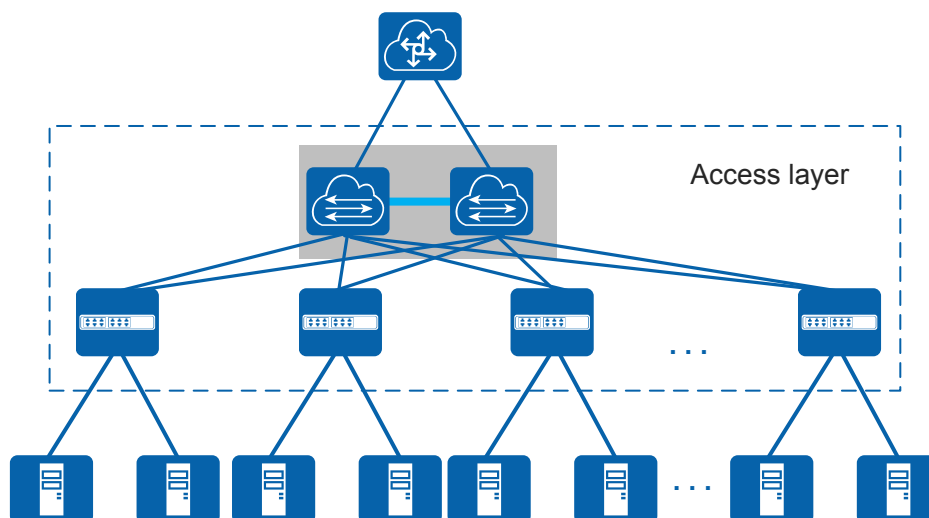


Compared with traditional access layer networking, SVF networking has the following advantages:

- Lower network construction costs: Low-cost switches are used as access switches, so network construction costs are reduced.

- Simpler configuration and management: SVF virtualizes multiple devices into one, reducing the number of nodes to manage.

- Higher scalability and more flexible deployment: When more access ports are required on the network, you only need to add low-cost fixed-configuration switches to the network. Moreover, these low-cost switches are deployed near servers, making network deployment more flexible.

# 4.2.3 VPN Features

## GRE

Generic Routing Encapsulation (GRE) is a protocol that encapsulates packets of some network layer protocols, such as Internetwork Packet Exchange (IPX), IPv6, and AppleTalk. Then the encapsulated packets can be transmitted over a different network layer protocol, such as IPv4.

As Layer 3 tunneling technology, GRE encapsulates packets of a protocol into packets of another protocol to transparently transmit packets over GRE tunnels. This technology enables packet transmission on heterogeneous networks.

## MCE

A BGP/MPLS IP VPN is a Layer 3 Virtual Private Network (L3VPN). BGP/MPLS IP VPN uses the Border Gateway Protocol (BGP) to advertise VPN routes and the Multiprotocol Label Switching (MPLS) to forward VPN packets on backbone networks. IP means that IP packets are carried by the VPN.

**Figure 4-5** shows the basic model of a BGP/MPLS IP VPN.

**Figure 4-5** Model of a BGP/MPLS IP VPN
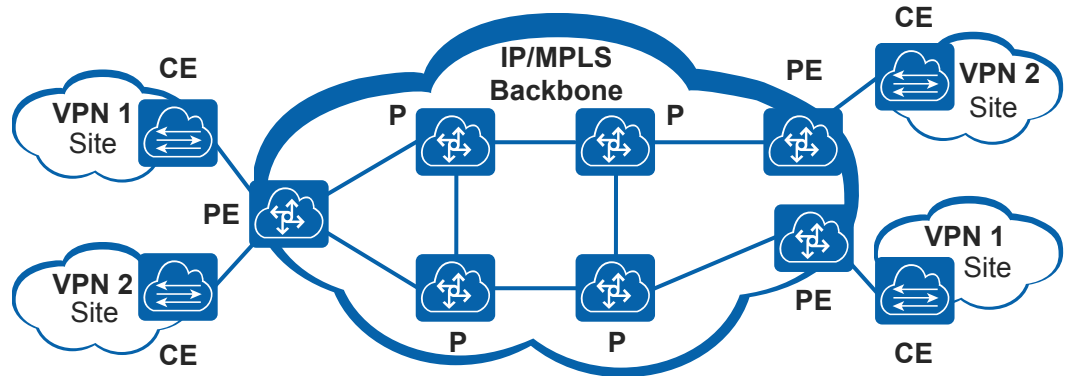


The BGP/MPLS IP VPN model consists of the following parts:

- Customer Edge (CE): It is an edge device on a customer network, providing interfaces that are directly connected to the Service Provider (SP) network. A CE can be a router, a switch, or a host. Usually, a CE neither senses the VPN nor supports MPLS.

- Provider Edge (PE): It is an edge device on an SP network. A PE is directly connected to the CE. On an MPLS network, PE devices process all VPN services. Therefore, the requirements on the performance of PE devices are rather high.

- Provider (P): It is a backbone device on an SP network. A P is not directly connected to CE devices. Ps only need to possess basic MPLS forwarding capabilities and do not maintain information about a VPN.

PE and P devices are managed by SPs. CE devices are managed by users except that the users trust SPs with the management right.

A PE can access multiple CE devices. A CE can be connected to multiple PE devices of the same SP or of different SPs.

BGP/MPLS IP VPN uses tunnels to transmit data of private networks on a public network. In the traditional BGP/MPLS IP VPN architecture, each VPN instance must use a CE device to connect to a PE device, as shown in **Figure 4-5**.

In may cases, a private network must be divided into multiple VPNs to realize fine-grained service management and enhance security. Services of users in different VPNs must be completely isolated. Deploying a CE device for each VPN increases the cost of device procurement and maintenance. If multiple VPNs share one CE device, data security cannot be ensured because all the VPNs use the same routing and forwarding table.

The MCE technology ensures data security between different VPNs while reducing network construction and maintenance costs. **Figure 4-6** shows the MCE deployment.

**Figure 4-6** Networking with an MCE device
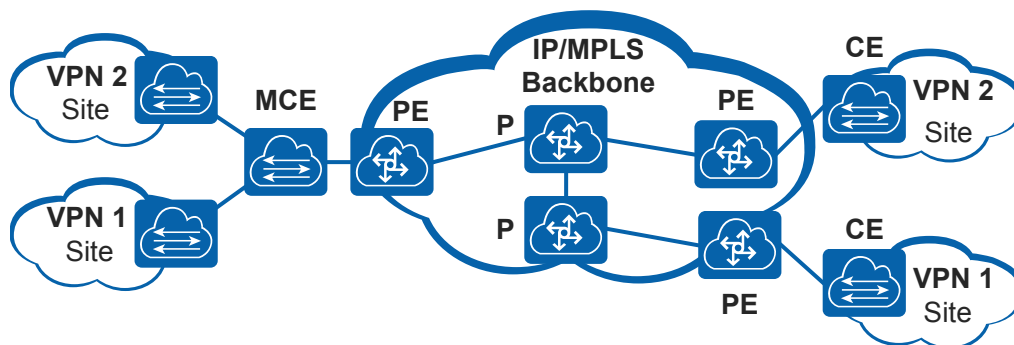


An MCE device has some PE functions. By binding each VPN instance to a different interface, an MCE device creates and maintains an independent VRF for each VPN. This application is also called multi-VRF application. The MCE device isolates forwarding paths of different VPNs on a private network and advertises routes of each VPN to the peer PE device, ensuring that VPN packets are correctly transmitted on the public network.

## 4.2.4 Reliability

### BFD

A network device must detect a communications fault between adjacent devices quickly so that the upper layer protocol can rectify the fault and prevent a service interruption. In practice, hardware detection is used to detect link faults. For example, Synchronous Digital Hierarchy (SDH) alarms are used to report link faults. However, not all media can provide the hardware detection mechanism. Applications use the Hello mechanism of the upper-layer routing protocol to detect faults. The detection duration is more than 1 second, which is too long for some applications. If no routing protocol is deployed on a small-scale Layer 3 network, the Hello mechanism cannot be used.

BFD provides fast fault detection independent of media and routing protocols. It has the following advantages:

- Rapidly detects link faults between neighboring network devices. The detected faults may occur on interfaces, data links, or forwarding engines.
- Provides uniform detection for all media and protocol layers in real time.

### VRRP

As networks rapidly develop and applications become diversified, various value-added services such as IPTV and video conferencing services are widely deployed. Demands for network infrastructure reliability are increasing, especially for nonstop service transmission.

Generally, all hosts on the same network segment have the same default route with the gateway address as the next hop address. The hosts use the default route to send packets to the gateway and the gateway forwards the packets to other network segments. When the gateway fails, hosts with the same default route cannot communicate with external networks. A common method to improve network reliability is to configure multiple egress gateways. However, route selection between the gateways becomes an issue.

VRRP resolves this issue. VRRP virtualizes multiple routing devices into a virtual router without changing the networking. The virtual router IP address is configured as the default gateway address. When the gateway fails, VRRP selects a new gateway to transmit service traffic to ensure reliable communication.

## DLDP

Sometimes unidirectional links occur on networks. On a unidirectional link, the local device can receive packets from the peer device at the link layer, but the peer device cannot receive packets from the local device. Unidirectional links result in problems such as loops on an STP topology.

As shown in **Figure 4-7** and **Figure 4-8**, a unidirectional link fault may be caused by intersected fibers or fiber disconnection.

**Figure 4-7** Intersected fibers
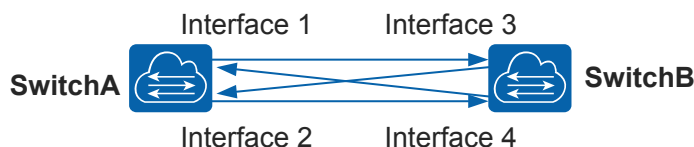


**Figure 4-8** Fiber disconnection
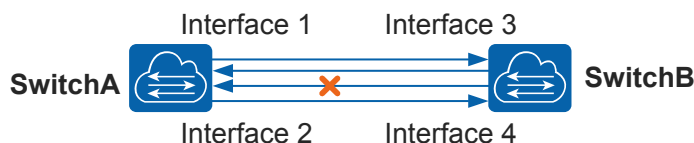


As a link layer protocol, DLDP works with physical layer protocols to detect the link status. The auto negotiation mechanism at the physical layer detects physical signals and faults, and DLDP identifies the peer device, detects unidirectional links, and shuts down unreachable interfaces. The auto negotiation mechanism and DLDP work together to detect and close unidirectional links at physical and logical layers. If the interfaces on both ends of a link work properly at the physical layer, DLDP checks connections and packet exchange between the two interfaces at the link layer. This detection cannot be implemented using the auto negotiation mechanism.

## Smart Link and Monitor Link

Smart Link is a link backup feature. A Smart Link group consists of two interfaces. One interface is the backup of the other. Smart Link is often used in dual-homing networking to implement link backup and rapid switchover.

Monitor Link monitors a device uplink interface and triggers the downlink interface status change according to the uplink interface status, which triggers switching of a topology protocol on the downstream device.

When a device connects to an upstream device through a single uplink, services are interrupted if a single point failure occurs. In dual-homing networking, a downstream device is connected to two upstream devices to reduce impact of single point failures and improve network reliability.

**Figure 4-9** Smart Link in dual-homing networking
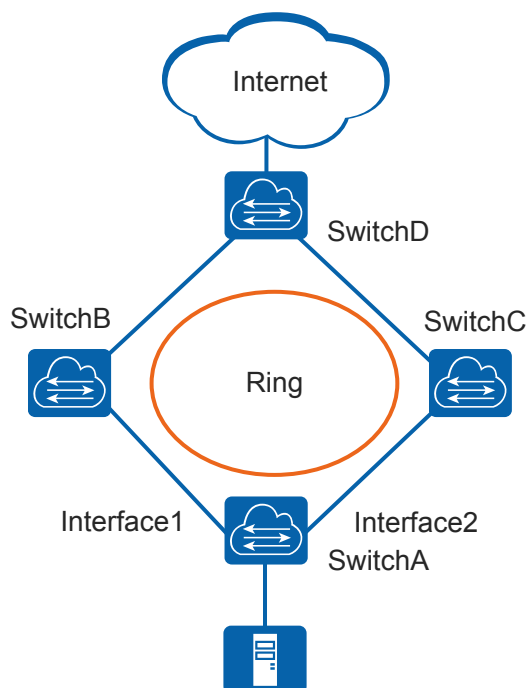


As shown in **Figure 4-9**, SwitchA is connected to SwitchB and SwitchC in dual-homing mode. Therefore, two links are available from SwitchA to SwitchD: SwitchA -> SwitchB -> SwitchD and SwitchA -> SwitchC -> SwitchD. Network loops may cause broadcast storms. Smart Link is configured on SwitchA. Normally, the link of Interface1 transmits traffic, and the link of Interface2 is a backup link. If the link of Interface1 fails, Smart Link automatically switches all the data traffic to the link of Interface2, ensuring nonstop service transmission.

Smart Link has following advantages:

- Prevents broadcast storms caused by loops. When two links are running properly in dual-homing networking, only one link transmits traffic and the other link is blocked.

- Is easy to configure and use.

- Ensures data forwarding. When the active link is faulty, traffic is switched to the standby link in milliseconds.

On some networks where Layer 2 topology protocols such as Smart Link are used, topology protocols cannot monitor the uplink interface status. As a result, services cannot be switched. Monitor Link monitors the uplink interface status of a device and changes the downlink interface status according to the uplink interface status, which triggers switching of a topology protocol on the downstream device. Monitor Link prevents traffic loss caused by the uplink fault.

## 4.2.5 Security

### AAA

Authentication, Authorization, and Accounting (AAA) provides a management mechanism for network security.

AAA provides the following functions:

- Authentication: verifies whether users are authorized for network access.

- Authorization: authorizes users to use particular services.

- Accounting: records the network resources used by users.

Users can only use one or more security services provided by AAA. For example, if a company wants to authenticate employees that access certain network resources, the network administrator only needs to configure an authentication server. If the company also wants to record operations performed by employees on the network, an accounting server is needed.

In summary, AAA authorizes users to access specific resources and records user operations. AAA is widely used because it features good scalability and facilitates centralized user information management. AAA can be implemented using multiple protocols. Currently, the device uses the Remote Authentication Dial-In User Service (RADIUS) or Huawei Terminal Access Controller Access Control System (HWTACACS) protocol to implement AAA. In most cases, the RADIUS protocol is used.

## 802.1x

802.1x authentication is an interface-based network access control method. It controls user access to network resources by authenticating the users on access interfaces.

802.1x authentication system uses a standard client/server architecture with three components: client, device, and authentication server.

- Client: an entity on a LAN link, which is authenticated by the device at the other end of the link. The client is usually a user terminal that supports 802.1x authentication. The user initiates 802.1x authentication by starting the client software.

- Device: an entity that authenticates the client at the peer end of the LAN link. The device is usually a network access device that supports the 802.1x protocol. The device provides an interface that allows the client to access the LAN.

- Authentication server: an entity that provides the authentication service for the client. The authentication server, usually a RADIUS server, carries out authentication, authorization, and accounting.

## ACL

An Access Control List (ACL) is composed of a list of rules. ACL rules classify packets so that the device processes classified packets in different manners.

## Local Attack Defense

A large number of packets including malicious attack packets are sent to the Central Processing Unit (CPU) on a network. If malicious attack packets are sent to the CPU, the CPU is busy with processing these attack packets for a long period. Services are interrupted and even the system fails. If a large number of packets are sent to the CPU, the CPU usage becomes high and CPU performance deteriorates. In this case, services cannot be processed in a timely manner.

To protect the CPU and ensure that the CPU can process services, the device provides local attack defense. Local attack defense protects the device against attacks. When an attack occurs, this function ensures uninterrupted services and minimizes the impact on network services.

## MFF

MAC-Forced Forwarding (MFF) isolates users at Layer 2 and allows users to communicate with each other at Layer 3 in a broadcast domain.

MFF uses proxy Address Resolution Protocol (ARP) to capture ARP request packets from users and to send ARP reply packets with a gateway MAC address to users. All traffic is sent to the gateway to implement Layer 2 isolation and Layer 3 communication.

## Attack Defense

Attack defense is a network security feature. This feature enables the device to analyze the content and behavior of packets sent to the CPU for processing, check whether packets are attack packets, and take measures for attack packets.

Attack defense is classified into malformed packet attack defense, packet fragment attack defense, and flood attack defense.

## Traffic suppression and storm control

Traffic suppression and storm control are security technologies to control broadcast packets, multicast packets, and unknown unicast packets and prevent broadcast storms caused by these packets.

Traffic suppression limits the traffic by setting a threshold, and storm control blocks the traffic by shutting down an interface.

&#x1F4D6;**NOTE**

Unknown unicast packets refer to unicast packets whose destination MAC addresses are not learned by the device.

## ARP Security

Address Resolution Protocol (ARP) security prevents ARP attacks and ARP-based network scanning attacks using a series of methods such as strict ARP learning, dynamic ARP inspection (DAI), ARP anti-spoofing, and rate limit on ARP packets.

## Port Security

Port security changes the dynamic MAC addresses learned on an interface into secure MAC addresses (including dynamic and sticky MAC addresses). This function prevents unauthorized users from communicating with the switch using this interface and therefore enhances device security.

## DHCP Snooping

The Dynamic Host Configuration Protocol (DHCP) snooping feature ensures that DHCP clients obtain IP addresses from authorized DHCP servers and records mappings between IP addresses and MAC addresses of DHCP clients, preventing DHCP attacks on the network.
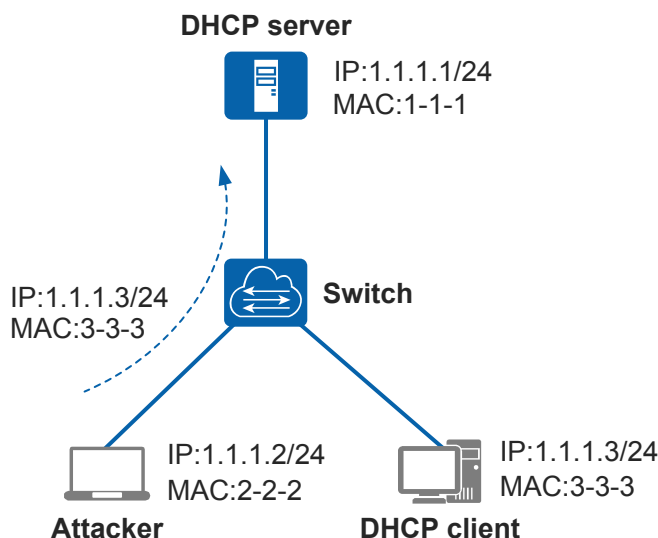
## IPSG

Some attacks on networks aim at source IP addresses by accessing and using network resources through spoofing IP addresses, stealing users' information or blocking authorized users from accessing networks. IPSG can prevent source address spoofing attacks.

IPSG enables the device to check IP packets against dynamic and static DHCP entries. Before the device forwards an IP packet, it compares the source IP address, source Media Access Control (MAC) address, interface, and Virtual Local Area Network (VLAN) information in the IP packet with entries in the binding table. If an entry is matched, the device takes the IP packet as a valid packet and forwards an IP packet. Otherwise, the device takes the IP packet as an attack packet and discards the packet.

As shown in **Figure 4-10**, an attacker sends bogus packets to modify the outbound interface in the MAC address table on the Switch. Then replies are sent from the server to the attacker.

**Figure 4-10** IP/MAC address spoofing attack



To prevent these attacks, you can configure IPSG on the Switch to check incoming IP packets against the binding entries. IP packets that match the binding entries are forwarded, and IP packets that do not match the binding entries are discarded.

## URPF

A Denial of Service (DoS) attack disables users from connecting to the server. DoS attacks aim to occupy excess resources by sending a large number of connection requests. As a result, authorized users cannot receive responses from the server.

Unicast Reverse Path Forwarding (URPF) check enables the device to check the source Internet Protocol (IP) address in theForwarding Information Base (FIB) table against the inbound interface of the packet. If the source IP address does not match the inbound interface of the packet, the packet is discarded. This prevents IP spoofing attacks, especially DoS attacks with bogus source IP address.

**Figure 4-11** URPF networking
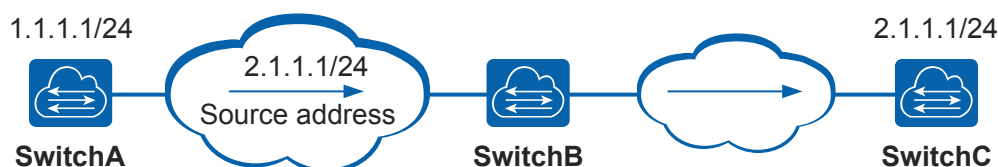
As shown in **Figure 4-11**, a bogus packet with source IP address 2.1.1.1 is sent from SwitchA to SwitchB. After receiving the bogus packet, SwitchB sends a response packet to the actual destination device SwitchC at 2.1.1.1. SwitchB and SwitchC are attacked by the bogus packets.

If URPF strict check is enabled on SwitchB, when SwitchB receives the bogus packet with source IP address 2.1.1.1, URPF discards the packet because the inbound interface of the source IP address is not the interface that receives the packet.

### SSL

The SSL protocol guards information privacy on the Internet. SSL can prevent data transmitted between the client and server from being intercepted or tampered with, and authenticate the identities of two communicating parties, ensuring secure data transmission.

### keychain

A keychain is a set of encryption rules, called keys. It authenticates applications and dynamically changes algorithms and keys during authentication.

## 4.2.6 QoS

### QoS Background

Diversified services enrich people's lives but also increase the risk of Internet traffic congestion. When traffic congestion occurs, services encounter long delays or even packet loss. As a result, services deteriorate or even become unavailable. Therefore, a solution to resolve traffic congestion on the IP network is urgently needed. The best way to limit traffic congestion is to increase network bandwidths. However, increasing network bandwidths is not feasible due to the high operation and maintenance costs. The most cost-effective way is to use a "guarantee" policy to manage traffic congestion.

QoS provides an end-to-end service guarantee for differentiated services. QoS efficiently uses network resources and allows traffic of different types to preempt network resources. Voice, video, and important data applications are the first to obtain resources on network devices. QoS has played an important role in improving Internet usage performance.

### QoS Service Models

- Best-Effort

  Best-Effort is the default service model for the Internet and applies to various network applications, such as FTP and email. It is the simplest service model. Without network notification, an application can send any number of packets at any time. The network then makes its best attempt to send the packets but can provide no guarantee of performance in terms of delay and reliability.

  The Best-Effort model applies to services that do not require low delay and high reliability.

- IntServ

  Before sending a packet, IntServ uses signaling to apply for a specific level of service from the network. The application first notifies the network of its traffic parameters.

After receiving a confirmation that sufficient resources have been reserved, the application sends the packet. The network maintains a state for each packet flow and executes QoS behaviors based on this state to ensure the guaranteed application performance. The packets must be controlled within the range described by the traffic parameters.

IntServ uses the Resource Reservation Protocol (RSVP) for signaling, which is similar to Multiprotocol Label Switching Traffic Engineering (MPLS TE). RSVP reserves resources such as bandwidth and priority on a known path, and each network element along the path must reserve required resources for data flows requiring QoS guarantee. That is, each network element maintains a soft state for each data flow. A soft state is a temporary state and is periodically updated using RSVP messages. Each network element checks whether sufficient resources can be reserved based on these RSVP messages. The path is available only when all involved network elements can provide sufficient resources.

- DiffServ

  DiffServ classifies packets on the network into multiple classes for differentiated processing. When traffic congestion occurs, classes with a higher priority are given preference. This function allows packets to be differentiated and to have different packet loss rates, delays, and jitters. Packets of the same class are aggregated and sent as a whole to ensure the same delay, jitter, and packet loss rate.

  In the DiffServ model, edge nodes classify and aggregate traffic. Edge nodes classify packets based on a combination of fields, such as the source and destination addresses of packets, precedence in the ToS field, and protocol type. Edge nodes also re-mark packets with different priorities, which can be identified by other nodes for resource allocation and traffic control. Therefore, DiffServ is a flow-based QoS model.

  Compared with IntServ, DiffServ requires no signaling. In the DiffServ model, an application does not need to apply for network resources before transmitting packets. Instead, the application notifies the network nodes of its QoS requirements by setting QoS parameters in packets. The network does not need to maintain a state for each data flow but provides differentiated services based on the QoS parameters of each data flow. DiffServ takes full advantage of network flexibility and extensibility of the IP network and transforms information in packets into per-hop behaviors, greatly reducing signaling operations.

## Components in the DiffServ Model

The DiffServ model consists of the following QoS components:

- Traffic classification and marking

  Traffic classification classifies data packets into different classes or sets different priorities, which can be implemented through traffic classifiers in the MQC configuration. Traffic marking sets different priorities for packets, which can be implemented through priority mapping and priority re-marking.

- Traffic policing, traffic shaping, and interface-based rate limiting

  Traffic policing and traffic shaping limit the traffic rate. When traffic exceeds the specified rate, traffic policing drops excess traffic, and traffic shaping buffers excess traffic. Interface-based rate limiting is classified into interface-based traffic policing and traffic shaping.

- Congestion management and congestion avoidance

  Congestion management buffers packets in queues when traffic congestion occurs and determines the forwarding order based on a specific scheduling algorithm. Congestion

avoidance monitors network resources. When the network becomes congested, the device drops packets to regulate traffic so that the network does not overload.

Traffic classification and marking are the basis for implementing differentiated services. Traffic policing, traffic shaping, interface-based rate limiting, congestion management, and congestion avoidance control network traffic and allocated resources.

Packets are processed by the components in the sequence outlined in **Figure 4-12**.

**Figure 4-12** Processing sequence of QoS components
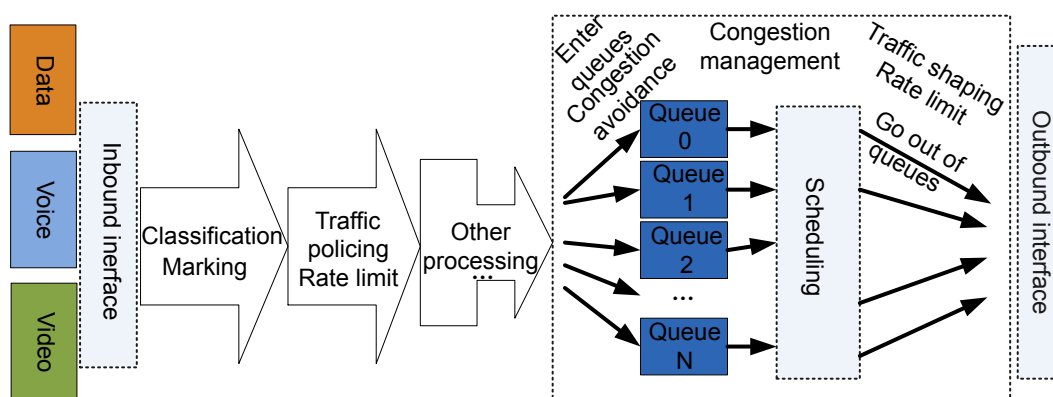


**Figure 4-13** shows the processing sequence of QoS components.

**Figure 4-13** Processing of QoS components
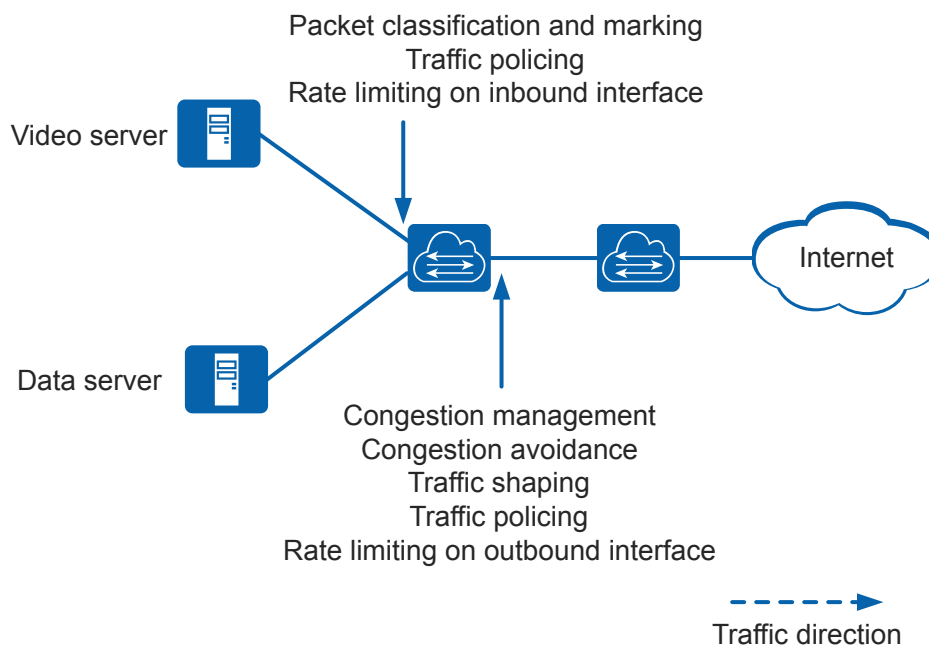
# 5 Operation Maintenance and Network Management

## About This Chapter

# 5.1 Maintenance and Management

## 5.1.1 Configuration Modes

### Configuration Methods

CE8800&7800&6800&5800 series switches support the following configuration and management methods:

- Command line

  Users can log in to the console port on CE8800&7800&6800&5800 series switches from a console terminal and then configure various features and parameters in the command-line interface (CLI).

- NMS configuration

  Users can configure and manage CE8800&7800&6800&5800 series switches using SNMP through a network management system (NMS) workstation.

### Login Modes

CE8800&7800&6800&5800 series switches provide a console port for users to configure CE8800&7800&6800&5800 series switches locally or remotely. Users can connect a console terminal to the console port through a serial port.

In addition, users can log in to CE8800&7800&6800&5800 series switches' service interfaces through Telnet, Stelnet, or SSH for configuration and management.

For user logins, CE8800&7800&6800&5800 series switches support multiple authentication modes, including non-authentication, local authentication, and AAA authentication.

## 5.1.2 Monitoring and Maintenance

### Hardware Monitoring

CE8800&7800&6800&5800 series switches provide the following hardware monitoring functions:

- Re-detect hardware faults to prevent incorrect detection caused by intermittent interference.
- Checks version mapping automatically when the system is running.

### Device Management and Maintenance

CE8800&7800&6800&5800 series switches provide the following device management and maintenance functions:

- Support online help for the command line in English and Chinese.
- Provide hierarchical commands and user rights management.

- Provide an information center to uniformly manage logs, alarms, and debugging information and redirect information as required.

- Provide electronic labeling. Users can query basic information about the main control boards, optical modules, and fan modules on the CLI, and back up the information to an external server using FTP or TFTP.

- Display the system version, module status, ambient temperature, CPU usage, and memory usage.

# 5.1.3 Software Upgrade and In-Service Patching

## Software Upgrade

Before a software upgrade, CE8800&7800&6800&5800 series switches can check the integrity and applicability of system software. Two software upgrade methods are available for CE8800&7800&6800&5800 series switches.

- Local upgrade

    When CE8800&7800&6800&5800 series switches are powered on and starting, the software can be loaded and upgraded using the BIOS menu.

- Remote in-service upgrade

    When CE8800&7800&6800&5800 series switches are running properly, the new software can be remotely downloaded using FTP or TFTP. When CE8800&7800&6800&5800 series switches restart, the new software runs and takes effect. This implements smooth remote software upgrade.

- Zero Touch Provisioning (ZTP)

    After an unconfigured device is powered on, it downloads the new system software from the remote file server to upgrade the system.

CE8800&7800&6800&5800 series switches support software version rollback in case of an upgrade failure.

## In-Service Patching

CE8800&7800&6800&5800 series switches support in-service patching to protect services from being affected when a patch is installed. Device information is recorded before and after in-service patching, so the patch can be rolled back to the previous version if necessary.

# 5.2 NMS

The CE8800&7800&6800&5800 series switches use Huawei eSight as a centralized NMS. eSight supports a multi-language graphical user interface (GUI) for convenient and visual operations. Additionally, eSight provides northbound interfaces to connect to a third-party NMS and supports flexible integration with other NMSs of carriers.

## 5.2.1 Network Management Modes

The NMS can manage the CE8800&7800&6800&5800 series switches in two modes: inband and outband.

## Inband Management

In inband management mode, network management information is transmitted through the service channel of the CE8800&7800&6800&5800 series switches, and no additional communications network is required between the NMS and the CE8800&7800&6800&5800 series switches. To perform inband management, the network administrator only needs to connect the NMS to adjacent network devices and set SNMP parameters.

The inband management mode features flexible networking in different geographical locations and has higher channel security than the outbound management mode. However, network management information consumes service bandwidth. If the service channel fails, the NMS cannot manage the CE8800&7800&6800&5800 series switches remotely.

## Outband Management

In outband management mode, an independent NMS network needs to be built between the CE8800&7800&6800&5800 series switches and the NMS to separate network management information from service information.

In outband management mode, the NMS can still manage the CE8800&7800&6800&5800 series switches even if the service channel fails, ensuring reliable transmission of network management information. However, the independent NMS network is limited by geographical locations.

# 5.2.2 eSight

eSight can display the software version, save and restore configuration files and software version, and support in-service patching for the CE8800&7800&6800&5800 series switches through CLI.

eSight provides the following functions.

## Resource Management

eSight provides resource management to help manage network resources including devices, interfaces, and links on a large and complicated network. Through resource management, you can query and manage resources on the CE8800&7800&6800&5800 series switches, and query and locate resources of non-Huawei devices.

## View Management

eSight provides a unified topology view of all devices on a network to help you easily obtain network information. eSight provides a powerful topology management function. You can browse device information in the system topology view, protocol topology view, and user-defined view. In addition, eSight provides user-friendly interfaces for operation and maintenance of network and devices.

The protocol topology views include the Ethernet view, covering the topologies of various networking modes and network hierarchies. These views support automatic discovery of a network topology and reflect the change of the network topology and device status in real time.

## Configuration Management

eSight provides configuration management and supports management of devices, interfaces, VLANs, Layer 2 features, software upgrade, and configuration files. It provides diverse configuration modes such as end-to-end configuration, batch configuration, and configuration wizard, and provides default configuration templates.

## Fault Management

Fault management is an important management means to maintain networks. On the GUI, you can query and monitor the running status and faults of the CE8800&7800&6800&5800 series switches in real time, filter faults, locate faults, confirm faults, and analyze faults. eSight can generate alarm sounds or display alarms on the alarm panel. It can be connected to an alarm box for convenient routine maintenance.

## Performance Management

eSight can collect data, monitor device performance, and analyze the collected data. It generates reports and graphic displays of device performance. With eSight, you can query the CPU capacity, device memory, and interfaces, and collect statistics about device load and user access. Then you can learn about the QoS of the network and assess and adjust network resource configuration in time.

Performance management is implemented based on eSight resource management.

## Security Management

eSight provides various measures for security management. Users are authenticated uniformly on eSight and user rights are configured based on the minimum granularity. In addition, eSight authenticates users to ensure system security and provides detailed operation logs for you to query and analyze user operations.

Security management includes user management, access control, user group management, and operation management.

# 5.3 Agile Controller-DCN

The Agile Controller-DCN (Controller for short) is a network controller developed by Huawei. Based on the hierarchical decoupling capability of the software-defined networking (SDN) architecture and interoperation with the CE8800&7800&6800&5800 series switches, the Controller provides an automatic mapping from applications to physical networks, POD deployment, and visualized operation and maintenance (O&M) for customers to build their service-oriented capabilities of dynamically scheduling network services. Additionally, the Controller can seamlessly interoperate with mainstream cloud platforms. Relying on the open and standard northbound and southbound interfaces, highly reliable cluster load balancing capability, as well as elastic scalability, the Controller allows customers to flexibly deploy and schedule network resources according to their service development, enabling the data center network to be more agile for cloud services.

As the core control center of the Huawei Cloud Fabric Data Center SDN Solution, the Controller has the following advantages:

1.  Highly-efficient: Automatic Delivery of Services and Network Resources, Shortening the Service Provisioning Period

– Abstracts services of different cloud management platforms and implements automatic delivery of network resources.

– Provisions network services through clicking or dragging in the logical model.

– Uniformly controls fabric networks of different types to realize on-demand service delivery.

2. Easy: Visible Control of Cloud Networks

– Provides visible management on physical and virtual network resources, services, and quality.

– Provides visible management on tenant services.

– Provides visible control on the Controller status.

3. Open: Enterprise Service Ecosystem

Provides standard interfaces to interoperate with the cloud management platform, VMM, Fabric network, and servers based on the hierarchical decoupling capability of the SDN architecture.

4. Elastic: Distributed Cluster Capability Highest in the Industry

– Supports elastic expansion of the cluster, with no impact on live network services.

– Implements load balancing when new members are added to the cluster or existing members remove from the cluster.

# 6 System Parameters

## About This Chapter

# 6.1 Specifications

**Table 6-1** lists the specifications of CE8800&7800&6800&5800 series switches.

**Table 6-1** Specifications

| Item | Description |
|------|-------------|
| Physical specifications | ● Dimensions (W x D x H):<br>  – CE8860-4C-EI: 442.0 mm x 600.0 mm x 88.1 mm<br>  – CE7850-32Q-EI: 442.0 mm x 607.0 mm x 43.6 mm<br>  – CE7855-32Q-EI: 442.0 mm x 607.0 mm x 43.6 mm<br>  – CE6810-48S4Q-EI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6810-48S4Q-LI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6810-48S-LI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6810-32T16S4Q-LI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE6810-24S2Q-LI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850-48S4Q-EI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850-48T4Q-EI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850-48S6Q-HI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850-48T6Q-HI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850U-24S2Q-HI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6850U-48S6Q-HI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6851-48S6Q-HI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE6855-48S6Q-HI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE6855-48T6Q-HI: 442.0 mm x 600.0 mm x 43.6 mm<br>  – CE6870-24S6CQ-EI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE6870-48S6CQ-EI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE5810-24T4S-EI: 442.0 mm x 420.0 mm x 43.6 mm<br>  – CE5810-48T4S-EI: 442.0 mm x 420.0 mm x 43.6 mm |

| Item | Description |
|---|---|
| | – CE5850-48T4S2Q-EI: 442.0 mm x 420.0 mm x 43.6 mm |
| | – CE5850-48T4S2Q-HI: 442.0 mm x 420.0 mm x 43.6 mm |
| | – CE5855-48T4S2Q-EI: 442.0 mm x 420.0 mm x 43.6 mm |
| | – CE5855-24T4S2Q-EI: 442.0 mm x 420.0 mm x 43.6 mm |
| | ● Weight (with two power modules and two fan modules, calculated based on the heaviest model if multiple models are supported): |
| | – CE8860-4C-EI: 21.2 kg |
| | – CE7850-32Q-EI: 11.2 kg |
| | – CE7855-32Q-EI: 11.2 kg |
| | – CE6810-48S4Q-EI: 10.4 kg |
| | – CE6810-48S4Q-LI: 10.4 kg |
| | – CE6810-48S-LI: 10.2 kg |
| | – CE6810-32T16S4Q-LI: 8.5 kg |
| | – CE6810-24S2Q-LI: 10.1 kg |
| | – CE6850-48S4Q-EI: 11.05 kg |
| | – CE6850-48T4Q-EI: 11.35 kg |
| | – CE6850-48S6Q-HI: 11.6 kg |
| | – CE6850-48T6Q-HI: 12.6 kg |
| | – CE6850U-24S2Q-HI: 12.3 kg |
| | – CE6850U-48S6Q-HI: 12.6 kg |
| | – CE6851-48S6Q-HI: 8.7 kg |
| | – CE6855-48S6Q-HI: 8.7 kg |
| | – CE6855-48T6Q-HI: 12.6 kg |
| | – CE6870-24S6CQ-EI: 8.4 kg |
| | – CE6870-48S6CQ-EI: 8.6 kg |
| | – CE5810-24T4S-EI: 8.0 kg |
| | – CE5810-48T4S-EI: 8.2 kg |
| | – CE5850-48T4S2Q-EI: 8.85 kg |
| | – CE5850-48T4S2Q-HI: 8.8 kg |
| | – CE5855-48T4S2Q-EI: 8.4 kg |
| | – CE5855-24T4S2Q-EI: 8.1 kg |

| Item | | Description |
|---|---|---|
| Environment parameters | Temperature | ● Operating temperature: 0°C to 40°C (0 m to 1800 m)<br>**NOTE**<br>When the altitude is between 1800 m and 5000 m, the highest operating temperature reduces 1°C every time the altitude increases 220 m.<br>● Storage temperature: -40°C to +70°C |
| | Relative humidity | 5% RH to 95% RH, noncondensing |
| | Altitude | < 5000 m |

| Item | | Description |
|---|---|---|
| | Noise (sound pressure, 27°C) | • CE8860-4C-EI:<br>  – Back-to-front airflow: < 58 dBA<br>  – Front-to-back airflow: < 56 dBA<br>• CE7850-32Q-EI:<br>  – Back-to-front airflow: < 55 dBA<br>  – Front-to-back airflow: < 54 dBA<br>• CE7855-32Q-EI:<br>  – Back-to-front airflow: < 55 dBA<br>  – Front-to-back airflow: < 54 dBA<br>• CE6810-48S4Q-EI:<br>  – Back-to-front airflow: < 51 dBA<br>  – Front-to-back airflow: < 48 dBA<br>• CE6810-48S4Q-LI:<br>  – Back-to-front airflow: < 51 dBA<br>  – Front-to-back airflow: < 48 dBA<br>• CE6810-48S-LI:<br>  – Back-to-front airflow: < 51 dBA<br>  – Front-to-back airflow: < 48 dBA<br>• CE6810-32T16S4Q-LI:<br>  – Back-to-front airflow: < 51 dBA<br>  – Front-to-back airflow: < 51 dBA<br>• CE6810-24S2Q-LI:<br>  – Back-to-front airflow: < 51 dBA<br>  – Front-to-back airflow: < 48 dBA<br>• CE6850-48S4Q-EI:<br>  – Back-to-front airflow: < 45 dBA<br>  – Front-to-back airflow: < 56 dBA<br>• CE6850-48T4Q-EI:<br>  – Back-to-front airflow: < 56 dBA<br>  – Front-to-back airflow: < 56 dBA<br>• CE6850-48S6Q-HI:<br>  – Back-to-front airflow: < 52 dBA<br>  – Front-to-back airflow: < 52 dBA<br>• CE6850-48T6Q-HI:<br>  – Back-to-front airflow: < 53 dBA<br>  – Front-to-back airflow: < 53 dBA<br>• CE6850U-24S2Q-HI:<br>  – Back-to-front airflow: < 52 dBA |

| Item | | Description |
|------|------|------|
| | | – Front-to-back airflow: < 52 dBA |
| | | ● CE6850U-48S6Q-HI: |
| | | – Back-to-front airflow: < 52 dBA |
| | | – Front-to-back airflow: < 52 dBA |
| | | ● CE6851-48S6Q-HI: |
| | | – Back-to-front airflow: < 56 dBA |
| | | – Front-to-back airflow: < 58 dBA |
| | | ● CE6855-48S6Q-HI: |
| | | – Back-to-front airflow: < 56 dBA |
| | | – Front-to-back airflow: < 58 dBA |
| | | ● CE6855-48T6Q-HI: |
| | | – Back-to-front airflow: < 53 dBA |
| | | – Front-to-back airflow: < 53 dBA |
| | | ● CE6870-24S6CQ-EI: |
| | | – Back-to-front airflow: < 55 dBA |
| | | – Front-to-back airflow: < 51 dBA |
| | | ● CE6870-48S6CQ-EI: |
| | | – Back-to-front airflow: < 55 dBA |
| | | – Front-to-back airflow: < 51 dBA |
| | | ● CE5810-24T4S-EI: |
| | | – Back-to-front airflow: < 43 dBA |
| | | – Front-to-back airflow: < 47 dBA |
| | | ● CE5810-48T4S-EI: |
| | | – Back-to-front airflow: < 43 dBA |
| | | – Front-to-back airflow: < 47 dBA |
| | | ● CE5850-48T4S2Q-EI: |
| | | – Back-to-front airflow: < 45 dBA |
| | | – Front-to-back airflow: < 45 dBA |
| | | ● CE5850-48T4S2Q-HI: |
| | | – Back-to-front airflow: < 45 dBA |
| | | – Front-to-back airflow: < 51 dBA |
| | | ● CE5855-48T4S2Q-EI: |
| | | – Back-to-front airflow: < 48 dBA |
| | | – Front-to-back airflow: < 55 dBA |
| | | ● CE5855-24T4S2Q-EI: |
| | | – Back-to-front airflow: < 48 dBA |
| | | – Front-to-back airflow: < 51 dBA |

| Item | | Description |
|---|---|---|
| Power specifications | Power source type | AC/DC/high-voltage DC |
| | AC power input | <ul><li>Rated input voltage range: 100 V AC to 240 V AC, 50/60 Hz</li><li>Maximum input voltage range:<ul><li>CE8860-4C-EI, CE6850-48S6Q-HI, CE6850-48T6Q-HI, CE6855-48T6Q-HI, CE6850U-48S6Q-HI, and CE6850U-24S2Q-HI: 90 V AC to 290 V AC, 47 Hz to 63 Hz</li><li>CE5855-48T4S2Q-EI and CE5855-24T4S2Q-EI: 90 V AC to 264 V AC, 47 Hz to 63 Hz</li><li>Other models: 90 V AC to 290 V AC, 45 Hz to 65 Hz</li></ul></li></ul> |
| | DC power input | The CE5800 series, CE6810 series, CE6870 series, CE6850-48S4Q-EI, CE6855-48S6Q-HI, and CE6851-48S6Q-HI support DC power inputs:<ul><li>Rated voltage range: -48 V DC to -60 V DC</li><li>Maximum voltage range: -38.4 V DC to -72 V DC</li></ul> |
| | High-voltage DC power input | The CE8860-4C-EI, CE6850-48S6Q-HI, CE6850-48T6Q-HI, CE6855-48T6Q-HI, CE6850U-48S6Q-HI, and CE6850U-24S2Q-HI support high-voltage DC power inputs:<ul><li>Rated voltage of 240 V high-voltage DC power input: 240 V DC</li><li>Maximum voltage range of 240 V high-voltage DC power input: 188 V DC to 290 V DC</li><li>Rated voltage range of 380 V high-voltage DC power input: 240 V DC to 380 V DC</li><li>Maximum voltage range of 380 V high-voltage DC power input: 188 V DC to 400 V DC</li></ul> |

| Item | | Description |
|---|---|---|
| | Maximum input current | <ul><li>150 W AC power (PAC-150WA): 2.5 A (90 V AC)</li><li>150 W AC power (ES0W2PSA0150): 3 A (90 V AC)</li><li>350 W AC power (PAC-350WA series): 5 A (90 V AC)</li><li>350 W DC power (PDC-350WA series): 11 A (-38.4 V DC)</li><li>600 W AC power (PAC-600WA series): 9 A (90 V AC)</li><li>600 W AC&240 V DC power module (PAC-600WB series): 9 A (90 V AC)/4 A (240 V DC)</li><li>600 W high-voltage DC power module (PHD-600WA series): 4 A (240 V DC)</li><li>1200 W AC&240 V DC power module (PAC-1K2WA series): 11 A (90 V AC)/8 A (240 V DC)</li><li>1200 W high-voltage DC power module (PHD-1K2WA series): 8 A (240 V DC)</li></ul> |

| Item | | Description |
|---|---|---|
| Chassis power consumption | Maximum power consumption | ● CE8860-4C-EI:<br>  – Fully configured with four CE88-D8CQ cards: 625 W<br>  – Fully configured with four CE88-D16Q cards: 585 W<br>  – Fully configured with four CE88-D24T2CQ cards: 750 W<br>  – Fully configured with four CE88-D24S2CQ cards: 602 W<br>● CE7850-32Q-EI: 431 W<br>● CE7855-32Q-EI: 444 W<br>● CE6810-48S4Q-EI: 238 W<br>● CE6810-48S4Q-LI: 238 W<br>● CE6810-48S-LI: 178 W<br>● CE6810-32T16S4Q-LI: 288 W<br>● CE6810-24S2Q-LI: 171 W<br>● CE6850-48S4Q-EI: 272 W<br>● CE6850-48T4Q-EI: 380 W<br>● CE6850-48S6Q-HI: 272 W<br>● CE6850-48T6Q-HI: 379 W<br>● CE6850U-24S2Q-HI: 282 W<br>● CE6850U-48S6Q-HI: 339 W<br>● CE6851-48S6Q-HI: 245 W<br>● CE6855-48S6Q-HI: 216 W<br>● CE6855-48T6Q-HI: 346 W<br>● CE6870-24S6CQ-EI: 258 W<br>● CE6870-48S6CQ-EI: 333 W<br>● CE5810-24T4S-EI: 68 W<br>● CE5810-48T4S-EI: 92 W<br>● CE5850-48T4S2Q-EI: 133 W<br>● CE5850-48T4S2Q-HI: 131 W<br>● CE5855-48T4S2Q-EI: 103 W<br>● CE5855-24T4S2Q-EI: 75 W |

| Item | | Description |
|---|---|---|
| | Typical power consumption | <ul><li>CE8860-4C-EI:<ul><li>– Fully configured with four CE88-D8CQ cards: 355 W (100% traffic load, QSFP28 cables on 32 ports, double power modules)</li><li>– Fully configured with four CE88-D16Q cards: 340 W (100% traffic load, QSFP+ cables on 64 ports, double power modules)</li><li>– Fully configured with four CE88-D24T2CQ cards: 522 W (100% traffic load, 3 m network cables on 96 ports and QSFP28 cables on 8 ports, double power modules)</li><li>– Fully configured with four CE88-D24S2CQ cards: 399 W (100% traffic load, SFP28 cables on 96 ports and QSFP28 cables on 8 ports, double power modules)</li></ul></li><li>CE7850-32Q-EI: 297 W (100% traffic load, QSFP + cables on 32 ports, double power modules)</li><li>CE7855-32Q-EI: 262 W (100% traffic load, QSFP + cables on 32 ports, double power modules)</li><li>CE6810-48S4Q-EI: 101 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)</li><li>CE6810-48S4Q-LI: 101 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)</li><li>CE6810-48S-LI: 89 W (100% traffic load, SFP+ cables on 48 ports, double power modules)</li><li>CE6810-32T16S4Q-LI: 204 W (100% traffic load, 3 m Ethernet cables on 32 ports, SFP+ high-speed copper cables on 16 ports, and QSFP+ high-speed copper cables on 4 ports, double power modules)</li><li>CE6810-24S2Q-LI: 88 W (100% traffic load, SFP + cables on 24 ports and QSFP+ cables on 2 ports, double power modules)</li><li>CE6850-48S4Q-EI: 180 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)</li><li>CE6850-48T4Q-EI: 305 W (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 4 ports, double power modules)</li><li>CE6850-48S6Q-HI: 166 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules)</li><li>CE6850-48T6Q-HI: 252 W (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 6 ports, double power modules)</li></ul> |

| Item | | Description |
|---|---|---|
| | | • CE6850U-24S2Q-HI: 183 W (100% traffic load, SFP+ cables on 24 ports and QSFP+ cables on 2 ports, double power modules) |
| | | • CE6850U-48S6Q-HI: 235 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | • CE6851-48S6Q-HI: 145 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | • CE6855-48S6Q-HI: 116 W (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | • CE6855-48T6Q-HI: 219 W (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | • CE6870-24S6CQ-EI: 151 W (100% traffic load, SFP+ cables on 24 ports and QSFP28 cables on 6 ports, double power modules) |
| | | • CE6870-48S6CQ-EI: 159 W (100% traffic load, SFP+ cables on 48 ports and QSFP28 cables on 6 ports, double power modules) |
| | | • CE5810-24T4S-EI: 58 W (100% traffic load, 3 m network cables on 24 ports, SFP+ cables on 4 ports, double power modules) |
| | | • CE5810-48T4S-EI: 80 W (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports, double power modules) |
| | | • CE5850-48T4S2Q-EI: 103 W (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | • CE5850-48T4S2Q-HI: 109 W (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | • CE5855-48T4S2Q-EI: 76 W (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | • CE5855-24T4S2Q-EI: 48 W (100% traffic load, 3 m network cables on 24 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |

| Item | | Description |
|---|---|---|
| Chassis heat dissipation | Maximum heat dissipation | ● CE8860-4C-EI:<br>  – Fully configured with four CE88-D8CQ cards: 2134 BTU/hr<br>  – Fully configured with four CE88-D16Q cards: 1998 BTU/hr<br>  – Fully configured with four CE88-D24T2CQ cards: 2561 BTU/hr<br>  – Fully configured with four CE88-D24S2CQ cards: 2056 BTU/hr<br>● CE7850-32Q-EI: 1471 BTU/hr<br>● CE7855-32Q-EI: 1515 BTU/hr<br>● CE6810-48S4Q-EI: 812 BTU/hr<br>● CE6810-48S4Q-LI: 812 BTU/hr<br>● CE6810-48S-LI: 607 BTU/hr<br>● CE6810-32T16S4Q-LI: 983 BTU/hr<br>● CE6810-24S2Q-LI: 583 BTU/hr<br>● CE6850-48S4Q-EI: 928 BTU/hr<br>● CE6850-48T4Q-EI: 1297 BTU/hr<br>● CE6850-48S6Q-HI: 928 BTU/hr<br>● CE6850-48T6Q-HI: 1293 BTU/hr<br>● CE6850U-24S2Q-HI: 962 BTU/hr<br>● CE6850U-48S6Q-HI: 1157 BTU/hr<br>● CE6851-48S6Q-HI: 836 BTU/hr<br>● CE6855-48S6Q-HI: 737 BTU/hr<br>● CE6855-48T6Q-HI: 1181 BTU/hr<br>● CE6870-24S6CQ-EI: 881 BTU/hr<br>● CE6870-48S6CQ-EI: 1135 BTU/hr<br>● CE5810-24T4S-EI: 232 BTU/hr<br>● CE5810-48T4S-EI: 314 BTU/hr<br>● CE5850-48T4S2Q-EI: 454 BTU/hr<br>● CE5850-48T4S2Q-HI: 447 BTU/hr<br>● CE5855-48T4S2Q-EI: 351 BTU/hr<br>● CE5855-24T4S2Q-EI: 256 BTU/hr |

| Item | | Description |
|---|---|---|
| | Typical heat dissipation | ● CE8860-4C-EI:<br>– Fully configured with four CE88-D8CQ cards: 1212 BTU/hr (100% traffic load, QSFP28 cables on 32 ports, double power modules)<br>– Fully configured with four CE88-D16Q cards: 1161 BTU/hr (100% traffic load, QSFP+ cables on 64 ports, double power modules)<br>– Fully configured with four CE88-D24T2CQ cards: 1783 BTU/hr (100% traffic load, 3 m network cables on 96 ports and QSFP28 cables on 8 ports, double power modules)<br>– Fully configured with four CE88-D24S2CQ cards: 1363 BTU/hr (100% traffic load, SFP28 cables on 96 ports and QSFP28 cables on 8 ports, double power modules)<br>● CE7850-32Q-EI: 1013 BTU/hr (100% traffic load, QSFP+ cables on 32 ports, double power modules)<br>● CE7855-32Q-EI: 895 BTU/hr (100% traffic load, QSFP+ cables on 32 ports, double power modules)<br>● CE6810-48S4Q-EI: 344 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)<br>● CE6810-48S4Q-LI: 344 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)<br>● CE6810-48S-LI: 302 BTU/hr (100% traffic load, SFP+ cables on 48 ports, double power modules)<br>● CE6810-32T16S4Q-LI: 696 BTU/hr (100% traffic load, 3 m Ethernet cables on 32 ports, SFP+ high-speed copper cables on 16 ports, and QSFP+ high-speed copper cables on 4 ports, double power modules)<br>● CE6810-24S2Q-LI: 300 BTU/hr (100% traffic load, SFP+ cables on 24 ports and QSFP+ cables on 2 ports, double power modules)<br>● CE6850-48S4Q-EI: 614 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 4 ports, double power modules)<br>● CE6850-48T4Q-EI: 1041 BTU/hr (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 4 ports, double power modules)<br>● CE6850-48S6Q-HI: 566 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |

| Item | | Description |
|---|---|---|
| | | ● CE6850-48T6Q-HI: 860 BTU/hr (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | ● CE6850U-24S2Q-HI: 624 BTU/hr (100% traffic load, SFP+ cables on 24 ports and QSFP+ cables on 2 ports, double power modules) |
| | | ● CE6850U-48S6Q-HI: 802 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | ● CE6851-48S6Q-HI: 495 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | ● CE6855-48S6Q-HI: 396 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | ● CE6855-48T6Q-HI: 747 BTU/hr (100% traffic load, 3 m network cables on 48 ports and QSFP+ cables on 6 ports, double power modules) |
| | | ● CE6870-24S6CQ-EI: 514 BTU/hr (100% traffic load, SFP+ cables on 24 ports and QSFP28 cables on 6 ports, double power modules) |
| | | ● CE6870-48S6CQ-EI: 543 BTU/hr (100% traffic load, SFP+ cables on 48 ports and QSFP28 cables on 6 ports, double power modules) |
| | | ● CE5810-24T4S-EI: 198 BTU/hr (100% traffic load, 3 m network cables on 24 ports, SFP+ cables on 4 ports, double power modules) |
| | | ● CE5810-48T4S-EI: 273 BTU/hr (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports, double power modules) |
| | | ● CE5850-48T4S2Q-EI: 351 BTU/hr (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | ● CE5850-48T4S2Q-HI: 372 BTU/hr (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | ● CE5855-48T4S2Q-EI: 259 BTU/hr (100% traffic load, 3 m network cables on 48 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |
| | | ● CE5855-24T4S2Q-EI: 164 BTU/hr (100% traffic load, 3 m network cables on 24 ports and SFP+ cables on 4 ports and QSFP+ cables on 2 ports, double power modules) |

| Item | | Description |
|---|---|---|
| Surge protection | | Ethernet electrical ports: 2 kV in common mode<br><br>Power module:<br><br>● AC:<br>  – CE8860-4C-EI, CE6850-48S6Q-HI, CE6850-48T6Q-HI, CE6855-48T6Q-HI, CE6850U-48S6Q-HI, and CE6850U-24S2Q-HI: 4 kV in common mode and 2.5 kV in differential mode<br>  – Other models: 6 kV in common mode and 6 kV in differential mode<br><br>● DC: 4 kV in common mode and 2 kV in differential mode |
| Heat dissipation | Heat dissipation mode | Air cooling |
| | Airflow | Front-to-back or back-to-front, which is determined by features of fan modules and power modules. |
| Reliability | Power module backup | 1+1 backup |
| | Fan module backup | The CE5850EI and CE5810EI support 1+1 backup of fan modules<br>**NOTE**<br>A CE6800, CE7800, CE5855EI, or CE5850HI chassis uses two fan modules, with each fan module containing two fans. The four fans in the chassis work in 3+1 backup mode.<br><br>A CE8860 uses two fan modules, which can work in 1+1 backup mode when the temperature is below 35°C. |
| | Hot swap | All the power modules and fan modules support hot swap. |

| Item | | Description |
|---|---|---|
| Technical specifications | Processor | ● CE8860-4C-EI: 1.5 GHz, quad-core |
| | | ● CE7850-32Q-EI: 1.5 GHz, quad-core |
| | | ● CE7855-32Q-EI: 1.5 GHz, quad-core |
| | | ● CE6810-48S4Q-EI: 1.5 GHz, quad-core |
| | | ● CE6810-48S4Q-LI: 1.2 GHz, quad-core |
| | | ● CE6810-48S-LI: 1.2 GHz, quad-core |
| | | ● CE6810-32T16S4Q-LI: 1.2 GHz, quad-core |
| | | ● CE6810-24S2Q-LI: 1.2 GHz, quad-core |
| | | ● CE6850-48S4Q-EI: 1.5 GHz, quad-core |
| | | ● CE6850-48T4Q-EI: 1.5 GHz, quad-core |
| | | ● CE6850-48S6Q-HI: 1.5 GHz, quad-core |
| | | ● CE6850-48T6Q-HI: 1.2 GHz, quad-core |
| | | ● CE6850U-24S2Q-HI: 1.5 GHz, quad-core |
| | | ● CE6850U-48S6Q-HI: 1.5 GHz, quad-core |
| | | ● CE6851-48S6Q-HI: 1.2 GHz, quad-core |
| | | ● CE6855-48S6Q-HI: 1.2 GHz, quad-core |
| | | ● CE6855-48T6Q-HI: 1.2 GHz, quad-core |
| | | ● CE6870-24S6CQ-EI: 1.5 GHz, quad-core |
| | | ● CE6870-48S6CQ-EI: 1.5 GHz, quad-core |
| | | ● CE5810-24T4S-EI: 1.2 GHz, dual-core |
| | | ● CE5810-48T4S-EI: 1.2 GHz, dual-core |
| | | ● CE5850-48T4S2Q-EI: 1.2 GHz, quad-core |
| | | ● CE5850-48T4S2Q-HI: 1.2 GHz, dual-core |
| | | ● CE5855-48T4S2Q-EI: 1 GHz, dual-core |
| | | ● CE5855-24T4S2Q-EI: 1 GHz, dual-core |

| Item | | Description |
|---|---|---|
| | DRAM Memory | ● CE8860-4C-EI: 4 GB |
| | | ● CE7850-32Q-EI: 4 GB |
| | | ● CE7855-32Q-EI: 4 GB |
| | | ● CE6810-48S4Q-EI: 2 GB |
| | | ● CE6810-48S4Q-LI: 2 GB |
| | | ● CE6810-48S-LI: 2 GB |
| | | ● CE6810-32T16S4Q-LI: 2 GB |
| | | ● CE6810-24S2Q-LI: 2 GB |
| | | ● CE6850-48S4Q-EI: 2 GB |
| | | ● CE6850-48T4Q-EI: 2 GB |
| | | ● CE6850-48S6Q-HI: 4 GB |
| | | ● CE6850-48T6Q-HI: 2 GB |
| | | ● CE6850U-24S2Q-HI: 4 GB |
| | | ● CE6850U-48S6Q-HI: 4 GB |
| | | ● CE6851-48S6Q-HI: 2 GB |
| | | ● CE6855-48S6Q-HI: 2 GB |
| | | ● CE6855-48T6Q-HI: 2 GB |
| | | ● CE6870-24S6CQ-EI: 4 GB |
| | | ● CE6870-48S6CQ-EI: 4 GB |
| | | ● CE5810-24T4S-EI: 2 GB |
| | | ● CE5810-48T4S-EI: 2 GB |
| | | ● CE5850-48T4S2Q-EI: 2 GB |
| | | ● CE5850-48T4S2Q-HI: 2 GB |
| | | ● CE5855-48T4S2Q-EI: 2 GB |
| | | ● CE5855-24T4S2Q-EI: 2 GB |

| Item | | Description |
|---|---|---|
| | NOR Flash | • CE8860-4C-EI: 16 MB |
| | | • CE7850-32Q-EI: 16 MB |
| | | • CE7855-32Q-EI: 16 MB |
| | | • CE6810-48S4Q-EI: 16 MB |
| | | • CE6810-48S4Q-LI: 16 MB |
| | | • CE6810-48S-LI: 16 MB |
| | | • CE6810-32T16S4Q-LI: 16 MB |
| | | • CE6810-24S2Q-LI: 16 MB |
| | | • CE6850-48S4Q-EI: 8 MB |
| | | • CE6850-48T4Q-EI: 8 MB |
| | | • CE6850-48S6Q-HI: 16 MB |
| | | • CE6850-48T6Q-HI: 16 MB |
| | | • CE6850U-24S2Q-HI: 16 MB |
| | | • CE6850U-48S6Q-HI: 16 MB |
| | | • CE6851-48S6Q-HI: 16 MB |
| | | • CE6855-48S6Q-HI: 16 MB |
| | | • CE6855-48T6Q-HI: 16 MB |
| | | • CE6870-24S6CQ-EI: 16 MB |
| | | • CE6870-48S6CQ-EI: 16 MB |
| | | • CE5810-24T4S-EI: 16 MB |
| | | • CE5810-48T4S-EI: 16 MB |
| | | • CE5850-48T4S2Q-EI: 8 MB |
| | | • CE5850-48T4S2Q-HI: 16 MB |
| | | • CE5855-48T4S2Q-EI: 16 MB |
| | | • CE5855-24T4S2Q-EI: 16 MB |

| Item | | Description |
|---|---|---|
| | NAND Flash | ● CE8860-4C-EI: 1 GB |
| | | ● CE7850-32Q-EI: 1 GB |
| | | ● CE7855-32Q-EI: 1 GB |
| | | ● CE6810-48S4Q-EI: 1 GB |
| | | ● CE6810-48S4Q-LI: 512 MB |
| | | ● CE6810-48S-LI: 512 MB |
| | | ● CE6810-32T16S4Q-LI: 512 MB |
| | | ● CE6810-24S2Q-LI: 512 MB |
| | | ● CE6850-48S4Q-EI: 1 GB |
| | | ● CE6850-48T4Q-EI: 1 GB |
| | | ● CE6850-48S6Q-HI: 1 GB |
| | | ● CE6850-48T6Q-HI: 1 GB |
| | | ● CE6850U-24S2Q-HI: 1 GB |
| | | ● CE6850U-48S6Q-HI: 1 GB |
| | | ● CE6851-48S6Q-HI: 1 GB |
| | | ● CE6855-48S6Q-HI: 1 GB |
| | | ● CE6855-48T6Q-HI: 1 GB |
| | | ● CE6870-24S6CQ-EI: 1 GB |
| | | ● CE6870-48S6CQ-EI: 1 GB |
| | | ● CE5810-24T4S-EI: 512 MB |
| | | ● CE5810-48T4S-EI: 512 MB |
| | | ● CE5850-48T4S2Q-EI: 1 GB |
| | | ● CE5850-48T4S2Q-HI: 1 GB |
| | | ● CE5855-48T4S2Q-EI: 512 MB |
| | | ● CE5855-24T4S2Q-EI: 512 MB |

| Item | | Description |
|---|---|---|
| Stack | Service port supporting the stack function | ● CE8860-4C-EI: ports on any cards<br>● CE7850-32Q-EI: 40GE optical ports<br>● CE7855-32Q-EI: 40GE optical ports<br>● CE6810-48S4Q-EI: 10GE optical ports and 40GE optical ports<br>● CE6810-48S4Q-LI: 10GE optical ports and 40GE optical ports<br>● CE6810-48S-LI: 10GE optical ports<br>● CE6810-32T16S4Q-LI: 10GE electrical ports, 10GE optical ports, and 40GE optical ports<br>● CE6810-24S2Q-LI: 10GE optical ports and 40GE optical ports<br>● CE6850-48S4Q-EI: 10GE optical ports and 40GE optical ports<br>● CE6850-48T4Q-EI: 10GE electrical ports (V100R002 and later versions) and 40GE optical ports<br>● CE6850-48S6Q-HI: 10GE optical ports and 40GE optical ports<br>● CE6850-48T6Q-HI: 10GE electrical ports and 40GE optical ports<br>● CE6850U-24S2Q-HI: 10GE optical ports and 40GE optical ports<br>● CE6850U-48S6Q-HI: 10GE optical ports and 40GE optical ports<br>● CE6851-48S6Q-HI: 10GE optical ports and 40GE optical ports<br>● CE6855-48S6Q-HI: 10GE optical ports and 40GE optical ports<br>● CE6855-48T6Q-HI: 10GE electrical ports and 40GE optical ports<br>● CE6870-24S6CQ-EI: 10GE optical ports and 100GE optical ports<br>● CE6870-48S6CQ-EI: 10GE optical ports and 100GE optical ports<br>● CE5810-24T4S-EI: 10GE optical ports<br>● CE5810-48T4S-EI: 10GE optical ports<br>● CE5850-48T4S2Q-EI: 10GE optical ports and 40GE optical ports<br>● CE5850-48T4S2Q-HI: 10GE optical ports and 40GE optical ports<br>● CE5855-48T4S2Q-EI: 10GE optical ports and 40GE optical ports |

| Item | Description |
|------|-------------|
| | • CE5855-24T4S2Q-EI: 10GE optical ports and 40GE optical ports<br>**NOTE**<br>Downlink GE electrical ports cannot be used as stack ports. |
| Safety standards compliance | • EN 60950-1:2006+A11:2009+A1:2010+A12:2011<br>• EN 60825-1:2007<br>• EN 60825-2:2010<br>• UL 60950-1:2007 2rd Edition<br>• CSA C22.2 No.650:2007 2rd Edition<br>• IEC 60950-1:2005+A1:2009<br>• AS/NZS 60950-1:2011<br>• GB4943:2011 |
| EMC standards compliance | • FCC 47CFR Part15 CLASS A<br>• ETSI EN 300 386 V1.6.1:2012<br>• ICES-003:2012 CLASS A<br>• CISPR 22:2008 CLASS A<br>• CISPR 24:2010<br>• EN 55022:2010 CLASS A<br>• EN 55024:2010<br>• AS/NZS CISPR 22:2009 CLASS A<br>• IEC 61000-3-2:2005+A1:2008+A2:2009/EN 61000-3-2:2006+A1:2009+A2:2009<br>• IEC 61000-3-3:2008/EN 61000-3-3:2008<br>• CNS 13438:2006 CLASS A<br>• VCCI V-4:2012 CLASS A<br>• VCCI V-3:2012 CLASS A<br>• EC Council Directive 2004/108/EC<br>• GB9254 |
| Safety and environmental standards compliance | • 2002/95/EC, 2011/65/EU<br>• 2002/96/EC, 2012/19/EU<br>• EC NO.1907/2006<br>• ETSI EN 300 019-1-1 V2.1.4<br>• ETSI EN 300 019-1-2 V2.1.4<br>• ETSI EN 300 019-1-3 V2.3.2<br>• ETSI EN 300753 V1.2.1 |