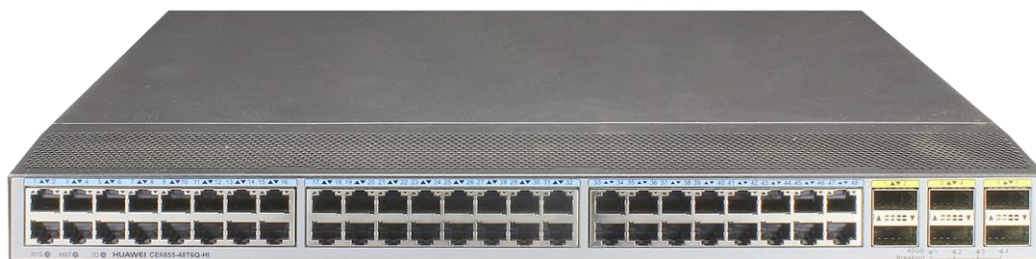




# Huawei CloudEngine 6850 Switch Datasheet

Huawei CloudEngine 6850 series switches have advanced hardware architecture with 40GE/100GE uplink ports and high-density 10GE access ports.



CloudEngine 6850 series provide high-density 10GE access to help enterprises and carriers build a scalable data center network platform in the cloud computing era. They can also be used as aggregation or core switches for enterprise campus networks.

# Product Overview

Huawei CloudEngine 6850 series switches are next-generation 10G Ethernet switches designed for data centers and high-end campus networks, providing high-performance, high-density 10GE ports, and low latency. The CE6850 series uses an advanced hardware architecture with 40GE uplink ports and high density 10GE access ports.

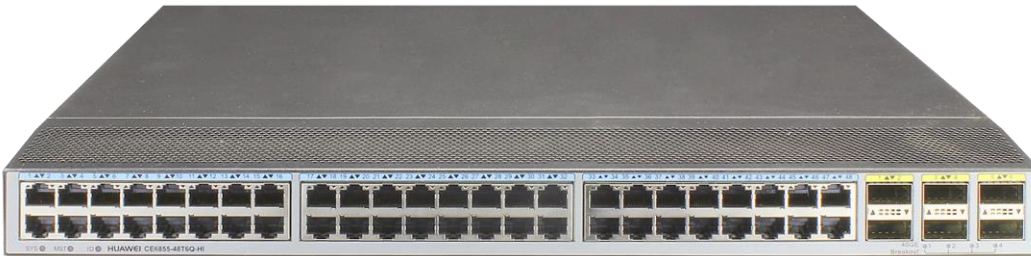
Using the Huawei VRP8 software platform, CE6850 series provide extensive data center service features and high stacking capability. In addition, the airflow direction (front-to-back or back-to-front) can be changed.

CE6850 series can work with CloudEngine 16800 or CloudEngine 12800 switches to build an elastic, virtualized, high-quality fabric that meets the requirements of cloud-computing data centers.

CE6850 series provide high-density 10GE access to help enterprises and carriers build a scalable data center network platform in the cloud computing era. They can also be used as aggregation or core switches for enterprise campus networks.

## Product Appearance

CloudEngine 6856-48T6Q-HI switches provide 48 x 10GE Base-T ports, 6 x 40GE QSFP+ ports.



# Product Characteristics

## High-Density 10GE Access

- CloudEngine 6850 series provide 48 x 10GE ports, high-density 10GE ports among 1 U ToR switches, allowing for high-density 10GE server access.
- CloudEngine 6850 series have a maximum of six 40GE QSFP+ ports. Each QSFP+ port can be used as four 10GE SFP+ ports, providing flexibility in networking. The uplink 40GE QSFP+ ports can be connected to CloudEngine 16800 or CloudEngine 12800 switches to build a non-blocking network platform.

## Highly Reliable, Long-Distance Stacking

16-member stack system

- A stack system of 16 member switches has up to 768 x 10GE access ports that provide high-density server access in a data center.
- Multiple switches in a stack system are virtualized into one logical device, making it possible to build a scalable and easy-to-manage data center network platform.
- A stack system separates the control plane from the data plane. This eliminates the risk of single points of failure and greatly improves system reliability.

Long-distance stacking

- CloudEngine 6850 series can use service ports as stack ports. A stack system can be established with switches in the same rack or different racks, and even over long distances.
- Service and stack bandwidths can be allocated based on the network scale to ensure that network resources are used more efficiently.

## Inter-device Link Aggregation, High Efficiency and Reliability

- CloudEngine 6850 series support multichassis link aggregation group (M-LAG), which enables links of multiple switches to aggregate into one to implement device-level link backup.
- Switches in an M-LAG system all work in active state to share traffic and back up each other, enhancing system reliability.
- Switches in an M-LAG system can be upgraded independently. During the upgrade, other switches in the system take over traffic forwarding to ensure uninterrupted services.
- M-LAG supports dual-homing to Ethernet, VXLAN, and IP networks, allowing for flexible networking.
- With comprehensive inter-device link aggregation technology, the device networking coupling relationship evolves from stacking at the control plane to the use of M-LAG and then finally to coupling-free M-LAG Lite. This achieves active-active server access and zero interruption of services when upgrading switches.

## Virtualized Hardware Gateway, Enabling Quick Deployment

- CloudEngine 6850 series can work with the industry's mainstream virtualization platforms and acts a hardware gateway on an overlay network (VXLAN). The virtualization function protects investments by ensuring services can be deployed quickly without requiring network changes.
- CloudEngine 6850 series can connect to a cloud platform through open APIs, facilitating the unified management of virtual and physical networks.
- The hardware gateway deployment enables fast service deployment without changing the customer network, providing investment protection.
- CloudEngine 6850 series support Border Gateway Protocol - Ethernet VPN (BGP-EVPN), which can run as the VXLAN control plane to simplify VXLAN configuration within and between data centers.

## Standard Interfaces, Enabling Openness and Interoperability

- CloudEngine 6850 series support NETCONF and can work with Huawei Agile Controller.
- CloudEngine 6850 series support Ansible-based automatic configuration and open-source module release, expanding network functions and simplifying device management and maintenance.
- CloudEngine 6850 series can be integrated into mainstream SDN and cloud computing platforms flexibly and quickly.

## ZTP, Implementing Automatic O&M

- CloudEngine 6850 series support Zero Touch Provisioning (ZTP). ZTP enables the CloudEngine 6850 series to automatically obtain and load version files from a USB flash drive or file server, freeing network engineers from onsite configuration and deployment. ZTP reduces labor costs and improves device deployment efficiency.
- ZTP provides built-in scripts through open APIs. Data center personnel can use a programming language they are familiar with, such as Python, to centrally configure network devices.
- ZTP decouples the configuration time of new devices from the device quantity and area distribution, which improves service provisioning efficiency.

## FabricInsight-based Intelligent O&M

- CloudEngine 6850 series proactively perform path detection over the entire network, periodically checking sample flows to determine the connectivity of all paths on the network and locates fault points, providing real-time network health information.
- CloudEngine 6850 series support visualization of all flows and congestion, improving service experience.

## Flexible Airflow Design, Improving Energy Efficiency

Flexible front-to-back/back-to-front airflow design

- CloudEngine 6850 series use a strict front-to-back/back-to-front airflow design that isolates cold air channels from hot air channels. This design improves heat dissipation efficiency and meets design requirements of data center equipment rooms.
- Air can flow from front to back or back to front depending on the fans and power modules that are used.
- Redundant power modules and fans can be configured to ensure service continuity.

Innovative energy-saving technologies

- CloudEngine 6850 series have innovative energy-saving chips and can measure system power consumption in real time. The fan speed can be adjusted dynamically based on system consumption. These energy-saving technologies reduce O&M costs and contribute to a greener data center.

## Clear Indicators, Simplifying Maintenance

### Clear indicators

- Port indicators clearly show the port status and port rate. The 40GE/100GE port indicators can show the states of all ports derived from the 40GE/100GE ports.
- State and stack indicators on both the front and rear panels enable users to maintain the switch from either side.
- CloudEngine 6850 series support remote positioning. Remote positioning indicators enable users to easily identify the switches they want to maintain in an equipment room full of devices.

### Simple maintenance

- The management port, fans, and power modules are on the front panel, which facilitates device maintenance.
- Data ports are located at the rear, facing servers. This simplifies cabling.

## Product Specifications

Note: This content is applicable only to regions outside mainland China. Huawei reserves the right to interpret this content.

### Functions and Features

Item	CloudEngine 6856-48T6Q-HI
Device virtualization	iStack
	Super Virtual Fabric (SVF)
	M-LAG
Network virtualization	TRILL
	VXLAN routing and bridging
	BGP-EVPN
	QinQ access VXLAN
Data center interconnect	VXLAN mapping, implementing interconnection between multiple DCI networks at Layer 2
SDN	Agile Controller
Network convergence	FCoE
	DCBX, PFC, ETS
Programmability	OPS
	OpenFlow
	Ansible-based automatic configuration and open-source module release
Traffic analysis	NetStream
	sFlow
VLAN	Adding access, trunk, and hybrid interfaces to VLANs
	Default VLAN
	QinQ

Item	CloudEngine 6856-48T6Q-HI
	MUX VLAN
	GVRP
MAC address table	Dynamic learning and aging of MAC address entries
	Static, dynamic, and blackhole MAC address entries
	Packet filtering based on source MAC addresses
	MAC address limiting based on ports and VLANs
IP routing	IPv4 routing protocols, such as RIP, OSPF, IS-IS, and BGP
	IPv6 routing protocols, such as RIPng, OSPFv3, IS-ISv6, and BGP4+
IPv6	IPv6 Neighbor Discovery (ND)
	Path MTU Discovery (PMTU)
	TCP6, IPv6 ping, IPv6 tracer, IPv6 socket, UDP6, and Raw IP6
Multicast	Multicast routing protocols such as IGMP, PIM-SM, PIM-DM, MSDP, and MBGP
	IGMP snooping
	IGMP proxy
	Fast leaving of multicast member interfaces
	Multicast traffic suppression
	Multicast VLAN
MPLS	Multi-Protocol Label Switching
Reliability	Link Aggregation Control Protocol (LACP)
	STP, RSTP, VBST, and MSTP
	BPDU protection, root protection, and loop protection
	Smart Link and multi-instance
	Device Link Detection Protocol (DLDP)
	ERPS (G.8032)
	Hardware-based Bidirectional Forwarding Detection (BFD)
	VRRP, VRRP load balancing, and BFD for VRRP
	BFD for BGP/IS-IS/OSPF/Static route
	BFD for VXLAN
QoS	Traffic classification based on Layer 2, Layer 3, Layer 4, and priority information
	ACL, CAR, re-marking, and scheduling
	Queue scheduling algorithms, including PQ, WRR, DRR, PQ+WRR, and PQ+DRR
	Congestion avoidance mechanisms, including WRED and tail drop
	Traffic shaping
O&M	Network-wide path detection

Item	CloudEngine 6856-48T6Q-HI
	Telemetry
	Statistics on the buffer microburst status
	VXLAN OAM: VXLAN ping and VXLAN tracet
Configuration and maintenance	Console, Telnet, and SSH terminals
	Network management protocols, such as SNMPv1/v2/v3
	File upload and download through FTP and TFTP
	BootROM upgrade and remote upgrade
	Hot patches
	User operation logs
	Zero Touch Provisioning (ZTP)
Security and management	802.1x authentication
	Command line authority control based on user levels, preventing unauthorized users from using commands
	Defense against DoS address attacks, ARP storms, and ICMP attacks
	Port isolation, port security, and sticky MAC
	Binding of the IP address, MAC address, port number, and VLAN ID
	Authentication methods, including AAA, RADIUS, and HWTACACS
	Remote Network Monitoring (RMON)

## Performance and Scalability

Item	CloudEngine 6856-48T6Q-HI
Maximum number of MAC address entries	288K
Maximum number of Forwarding routes (FIB IPv4/ IPv6)	256K/128K
ARP table size	128K
Maximum number of VRF	4096
IPv6 ND (Neighbor Discovery) table size	48K
Maximum Number of multicast routes (Multicast FIB IPv4/IPv6)	8K/2K
Maximum VRRP groups	256
Maximum number of ECMP paths	128
Maximum ACL number	Ingress14750/Egress 1000
Maximum Number of broadcast domains	8K
Maximum number of BDIF	4K

Item	CloudEngine 6856-48T6Q-HI
Maximum number of tunnel endpoints (VTEP)	2K
Maximum number of lag group	1024/512/256/128/64
Maximum number of links in a lag group	2/4/8/16/32
Maximum number of MSTP instance	64
VBST (Maximum number of VLANs where VBST can be configured)	500

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

## Hardware Specifications

Item	CloudEngine 6856-48T6Q-HI	
Physical Features	Dimensions (W × D ×H, mm)	442*600 *43.6
	Weight (excluding optical transceivers, power modules, and fan assemblies/ including AC power modules and fan assemblies, excluding optical transceivers, kg)	8.8/12.6
	Switching capacity (Tbps)	1.44
	Forwarding performance (Mpps)	1080
10GE SFP+ ports		0
10GE BASE-T		48
40GE QSFP+ ports		6
40/100GE QSFP28 ports		0
Management interface	Out-of-band management port	2*GE RJ45 & SFP (combo) management interfaces
	Console port	1*RJ45 + 1*MiniUSB (multiplexing)
	USB port	1
CPU	Main frequency (GHZ)	1.2
	Number of cores	4
Storage	RAM	4GB (CloudEngine 6856-48T6Q-HI) 2GB (CloudEngine 6855-48T6Q-HI)
	NOR Flash	16MB
	NAND Flash	1GB
System	System buffer	16MB
Power Supply System	Power modules	AC: 600W AC HDC: 600W 380V DC: 1200W -48V
	Rated voltage range (V)	AC: 100V to 240V

Item		CloudEngine 6856-48T6Q-HI
		DC 380V HVDC: 240V to 380V DC: -48V to -60V
	Maximum voltage range (V)	AC: 90V to 290V 240V HVDC: 188V to 290V DC 380V HVDC: 188V to 400V DC: -38.4V to -72V
	Maximum input current	600W AC power module: 100V to 240V 8 A 600W 240VDC power module: 240V 4A 600W 380VDC power module: 240V to 380V 4 A 1200 -48V power module: -48V to 60V 38A
	Typical power	219 W (100% traffic load, 3 m network cable and copper cable, normal temperature, dual power modules) 224 W (100% traffic load, 3 m network cable, short-distance optical transceivers, normal temperature, dual power modules)
	Maximum power	346W
	Frequency (AC, HZ)	50/60
	Heat Dissipation	Heat dissipation mode
Number of fan trays		2
Heat dissipation airflow		Front-to-back or back-to-front airflow
Maximum heat consumption (BTU/hr)		1181
Environment specifications	Long-term operating temperature (°C)	0°C to 40°C (0-1800m) The temperature decreases by 1°C each time the altitude increases by 220 m.
	Storage temperature(°C)	-40°C to +70°C
	Relative humidity	5% to 95%
	Operating altitude (m)	Up to 5000
	Sound power at 27°C (dBA)	Front-to-back airflow: < 64 Back-to-front airflow: < 64
	Sound power at 40°C (dBA)	Front-to-back airflow: < 80 Back-to-front airflow: < 84
	Sound pressure at 27°C (dBA)	Front-to-back airflow: 48 in average (maximum: 53) Back-to-front airflow: 58 in average (maximum: 53)
	Surge protection	AC power supply protection: 6 kV in common mode and 6 kV in differential mode DC power supply protection: 4 kV in common mode and 2 kV in differential mode
Reliability	MTBF (year)	54.48
	MTTR (hour)	1.81



Item	CloudEngine 6856-48T6Q-HI
Availability	0.99999620929

Note: For detailed information of CloudEngine 6800 Platform hardware information, visit <https://support.huawei.com/enterprise/en/doc/EDOC1000019246?idPath=7919710%7C21782165%7C21782239%7C22318540%7C7597815>

## Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of CloudEngine switches.

Certification Category	Description
Safety	<ul style="list-style-type: none"> <li>• EN 60950-1</li> <li>• EN 60825-1</li> <li>• EN 60825-2</li> <li>• UL 60950-1</li> <li>• CSA-C22.2 No. 60950-1</li> <li>• IEC 60950-1</li> <li>• AS/NZS 60950-1</li> <li>• GB4943</li> </ul>
Electromagnetic Compatibility (EMC)	<ul style="list-style-type: none"> <li>• EN 300386</li> <li>• EN 55032: CLASS A</li> <li>• EN 55024</li> <li>• IEC/EN 61000-3-2</li> <li>• IEC/EN 61000-3-3</li> <li>• FCC 47CFR Part15 CLASS A</li> <li>• ICES-003: CLASS A</li> <li>• CISPR 32: CLASS A</li> <li>• CISPR 24</li> <li>• AS/NZS CISPR32</li> <li>• VCCI- CISPR32: CLASS A</li> <li>• GB9254 CLASS A</li> </ul>
Environment	<ul style="list-style-type: none"> <li>• 2011/65/EU EN 50581</li> <li>• 2012/19/EU EN 50419</li> <li>• (EC) No.1907/2006</li> <li>• GB/T 26572</li> <li>• ETSI EN 300 019-1-1</li> <li>• ETSI EN 300 019-1-2</li> <li>• ETSI EN 300 019-1-3</li> <li>• ETSI EN 300 753 GR63</li> </ul>

### Note

EMC: electromagnetic compatibility

CISPR: International Special Committee on Radio Interference

EN: European Standard

ETSI: European Telecommunications Standards Institute

CFR: Code of Federal Regulations

FCC: Federal Communication Commission

IEC: International Electrotechnical Commission

AS/NZS: Australian/New Zealand Standard

VCCI: Voluntary Control Council for Interference

UL: Underwriters Laboratories

CSA: Canadian Standards Association

## Supported MIBs

For details about the MIB information, visit

<https://support.huawei.com/hedex/hdx.do?docid=EDOC1100101219&lang=en&idPath=24030814%7C21782165%7C21782239%7C22318540%7C7597815>.

## Optical Transceivers and Cable

For details about the optical transceivers and cables information, visit

<https://e.huawei.com/en/material/networking/dcs/switch/f6d91cf16df0474998087676a33fd41e>.

## Ordering Information

Mainframe	
CE6856-48T6Q-HI	CE6856-48T6Q-HI Switch (48-Port 10GE RJ45, 6-Port 40GE QSFP+, 2*FAN Box, Without Fan and Power Module)
CE6856-HI-B-B00	CE6856-48T6Q-HI Switch (48-Port 10GE RJ45, 6-Port 40GE QSFP+, 2*AC Power Module, 2*FAN Box, Port-side Intake)
CE6856-HI-F-B00	CE6856-48T6Q-HI Switch (48-Port 10GE RJ45, 6-Port 40GE QSFP+, 2*AC Power Module, 2*FAN Box, Port-side Exhaust)

### Fan Tray

Model	Description	Applicable Product
FAN-060A-F	Fan box (F, FAN panel side intake)	CE6856-48T6Q-HI
FAN-060A-B	Fan box (B, FAN panel side exhaust)	CE6856-48T6Q-HI

### Power

Model	Description	Applicable Product
PDC-1K2WA-F	1200W DC Power Module (Front to Back, Power panel side intake)	CE6856-48T6Q-HI
PDC-1K2WA-B	1200W DC Power Module (Back to Front, Power panel side exhaust)	CE6856-48T6Q-HI
PAC-600WB-F	600W AC&240V DC Power Module (Power panel side intake)	CE6856-48T6Q-HI
PAC-600WB-B	600W AC&240V DC Power Module (Power panel side exhaust)	CE6856-48T6Q-HI
PHD-600WA-F	600W HVDC Power Module (Power panel side intake)	CE6856-48T6Q-HI
PHD-600WA-B	600W HVDC Power Module (Power panel side exhaust)	CE6856-48T6Q-HI

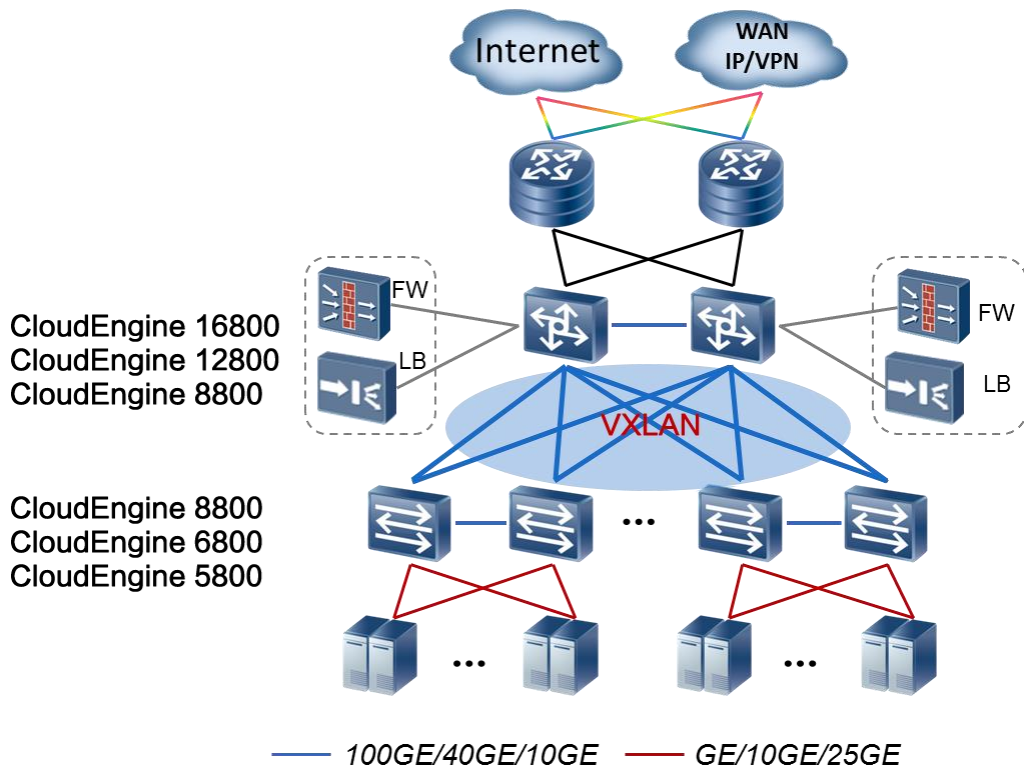
Model	Description	Applicable Product
	exhaust)	

Software	
CE68-LIC-BUN01	CE6800 Function License Bundle 1
CE68-LIC-VXLAN	CloudEngine 6800 VXLAN Function
CE68-LIC-TLM	CE6800 Telemetry Function
N1-CE68LIC-CFMM	N1-CloudFabric Management SW License for CloudEngine 6800(N1-CE68LIC-CFMM software is applicable to Non-SDN scenario, includes basic software functions and VXLAN)
N1-CE68CFMM-SnS1Y	N1-CE68CFMM-SnS1Y,N1-CloudFabric Management SW License for CloudEngine 6800
N1-CE68LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 6800 (N1-CE68LIC-CFFD software is applicable to single DC scenarios, includes basic software functions, VXLAN, and Telemetry,Agile Controller-DCN management of each fixed device,Fabricinsight Intelligent network analysis basic function)
N1-CE68CFFD-SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine 6800-SnS-1 Year (The annual fee for the CloudFabric N1 package )
N1-CE68LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 6800 (N1-CE68LIC-CFAD software is applicable to multiple DC scenarios, includes all the functions of the N1-CE68LIC-CFFD software package and NSH function)
N1-CE68CFAD-SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine -SnS -1 Year (The annual fee for the CloudFabric N1 package)

## Networking and Application

### Data Center Applications

On a typical data center network, CloudEngine 6850 series switches work as TOR switches and connect to CloudEngine16800, CloudEngine 12800 or CloudEngine 8800 core switches using 40GE/100GE ports, building an end-to-end 40GE/100GE full-mesh network. The core and TOR switches use fabric technologies such as VXLAN to build a non-blocking large Layer 2 network, which allows for large-scale VM migration and flexible service deployment.



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

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