Huawei CloudEngine 6870-48S6CQ-EI-A Switch Datasheet

CloudEngine 6870 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 6870 series switches are next-generation 10GE Ethernet switches designed for data centers and high-end campus networks, providing high-performance, high-density 10GE ports, and low latency. The CloudEngine 6870 series have advanced hardware architecture with 100GE uplink ports and high-density 10GE access ports. The 8 GB physical buffer can effectively cope with traffic bursts in video and search services.

Using the Huawei VRP8 software platform, CloudEngine 6870 series switches provide extensive data center service features and high stacking capability. In addition, the airflow direction (front-to-back or back-to-front) can be changed. CloudEngine 6870 series can work with CloudEngine 16800 to build an elastic, virtualized, high-quality fabric with end-to-end large buffer, meeting the requirements of cloud-computing data centers.

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Product Appearance

CloudEngine 6870-48S6CQ-EI-A provides 48*10GE SFP+ ports, 6*100GE QSFP28 ports or 6*40GE QSFP+ ports.



Product Characteristics

Large Buffer, High-Density Access

- High-density 10GE access capability

» CloudEngine 6870 series (1 U ToR switches) provide 720 Mpps forwarding performance and supports L2/L3 line-rate forwarding.

» CloudEngine 6870 series provide up to 48*10GE ports, allowing for high-density 10GE server access.

» CloudEngine 6870 series provide six 100GE QSFP28 ports. Each QSFP28 port can be used as one 40GE QSFP+ port, four 25GE SFP28 ports, or four 10GE SFP+ ports, providing flexibility in networking. The 100GE uplink ports four 25GE SFP28 ports, or four 10GE SFP+ ports, providing flexibility in networking. The 100GE uplink ports can be connected to CE16800 switches to build a 100GE fully-connected network platform without oversubscription.

- Super large buffer size

» All ports on CloudEngine 6870 series support ingress distributed buffering to effectively cope with traffic bursts.

» CloudEngine 6870 series hardware supports a maximum of 8 GB buffer, which is dynamically shared among all ports.

Inter-device Link Aggregation, High Efficiency and Reliability

- CloudEngine 6870 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 the 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 Gateway Achieves Fast Service Deployment

- CloudEngine 6870 series can work with a mainstream virtualization platform. As the high-performance, hardware gateway of an overlay network (VXLAN), the CloudEngine 6870 series can support more than 16 million tenants.
- CloudEngine 6870 series can connect to a cloud platform through an open API to provide unified management of software and hardware networks.
- The hardware gateway deployment enables fast service deployment without changing the customer network, providing investment protection.
- CloudEngine 6870 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.

Converged Enhanced Ethernet, Allowing for Data, Storage, and Computing Traffic on One Network

- CloudEngine 6870 series switches support Fibre Channel over Ethernet (FCoE), which permits storage, data, and computing services to be transmitted on one network, reducing the costs of network construction and maintenance.
- CloudEngine 6870 series switches support centralized FCoE/FC gateway deployment, which makes network O&M simpler.
- Various CloudEngine 6870 series switches support multiple data center features: Priority-based Flow Control (PFC), Enhanced Transmission Selection (ETS) and Data Center Bridging Exchange (DCBX). These features ensure low latency and zero packet loss for FC storage and high-speed computing services.

Full Openness and Programmability, Flexible Customization

- CloudEngine 6870 series use the Open Programmability System (OPS) embedded in the VRP8 software platform to provide programmability at the control plane.
- The OPS provides open APIs. APIs can be integrated with mainstream cloud platforms (including commercial and open cloud platforms) and third-party controllers. The OPS enables services to be flexibly customized and provides automatic management.
- Users or third-party developers can use open APIs to develop and deploy specialized network management policies to implement extension of fast service functions, automatic deployment, and intelligent management. The OPS also implements automatic operation and maintenance, and reduces management costs.
- CloudEngine 6870 series support CE modules for Ansible, which enables unified provisioning of physical and virtual networks.
- CloudEngine 6870 series can seamlessly integrate with systems of F5, an industry-leading application delivery network provider, to build an active-active data center network.
- The OPS provides seamless integration of data center service and network in addition to a service-oriented, software-defined networking (SDN).

Zero Touch Provisioning, Automatic O&M

- CloudEngine 6870 series support Zero Touch Provisioning (ZTP). ZTP enables CloudEngine 6870 series to automatically obtain and load version files from a USB flash drive or file server, freeing network engineers from onsite configuration or deployment. ZTP reduces labor costs and improves device deployment efficiency.
- ZTP provides built-in scripts for users through open APIs. Data center personnel can use the programming language they are familiar with, such as Python, to provide unified configuration of network devices.
- ZTP decouples configuration time of new devices from device quantity and area distribution, which improves service provisioning efficiency.

FabricInsight-based Intelligent O&M

- The CloudEngine 6870 series provides telemetry technology to collect device data in real time and send the data to Huawei data center network analyzer iMaster NCE-FabricInsight. The iMaster NCE-FabricInsight analyzes network data based on the intelligent fault identification algorithm, accurately displays the real-time network status, effectively demarcates and locates faults in a timely manner, and identifies network problems that affect user experience, accurately guaranteeing user experience.

iMaster NCE-based Simplified Network Deployment

- CloudEngine 6870 series switches can interconnect with iMaster NCE-Fabric through standard protocols such as NetConf and SNMP to implement network automatic management and control, providing more efficient and intelligent operation methods, simplifying network management, and reducing the OPEX.

Flexible Airflow Design, High Energy Efficiency

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

» CloudEngine 6870 series use front-to-back/back-to-front airflow design that isolates cold air channels from hot air channels. This design meets heat dissipation requirements in data center equipment rooms.

» Air can flow from front to back, or back to front when different fans and power modules are used.

» Redundant power modules and fans can be configured to ensure uninterrupted service transmission.

- Energy-saving technology

» CloudEngine 6870 series switches have energy-saving chips and can measure system power consumption in real time. Fan speed can be adjusted dynamically based on system consumption. These energy-saving technologies reduce O&M costs and contribute to a greener data center.

Clear Indicators, Simple Maintenance

- Clear indicators

» Port indicators clearly show port status and port speeds. The 100GE port indicators can show the states of all ports derived from the 100GE ports.

» State and stack indicators on both the front and rear panels enable operators to maintain the switch from either side.

» CloudEngine 6870 series switches support remote positioning. Operators can turn on remote positioning indicators on the switches they want to maintain, so that they can find switches easily in an equipment room full of devices.

- Simple maintenance

» The management port, fans, and power modules are on the front panel, which facilitates device maintenance.

» Data ports are located at the rear, facing servers. This simplifies cabling.

Licensing

CloudEngine 6870-48S6CQ-EI-A supports both the traditional feature based licensing mode and the latest Huawei IDN One Software (N1 Huawei IDN One Software (N1 mode for short) licensing mode. The CloudFabric N1 business model combines the NCE controller, analyzer and CloudEngine switch software for use in a range of common scenarios. This simplifies transactions, provides customers with more functions and value, and protects their software investment with Software License Portability.

Product	Feature	N1 Mandatory Software Packages			N1 Add on Software Packages
CloudEngine 6881 series switch		Foundation	Advanced	Premium	Multi-cloud Multi-DC Value-added Package
	Basic software	√	√	√	
	IPv6	√	√	√	
	VXLAN	√	√	√	
	Lossless upgrade	√	√	√	
	Telemetry	√	√	√	

Product	Feature	N1 Mandatory Software Packages			N1 Add on Software Packages
	MPLS		√	√	
iMaster NCE-Fabric controller	SDN automation	√	√	√	
	Basic intent functions (simulation and verification, and network-wide configuration rollback)			√	
	Multi-cloud multi-DC function				√
iMaster NCE-FabricInsight analyzer	Basic network analysis functions of telemetry	√	√	√	
	Network health ("1-3-5" intelligent O&M)		√	√	
	Value-added functions for network traffic analysis (managing 100 VMs)			√	
Version mapping		Select one from three options. The Advanced software package contains functions of the Foundation software package, and the Premium software package contains functions of the Advanced software package.			It is used with the Foundation, Advanced, or Premium software package.
For details about product function differences, refer to the product documentation.					

Note: For detailed information of Huawei CloudFabric N1 business model, visit https://e.huawei.com/en/material/networking/dcswitch/03a0e69bfa2c4f168323ba94a75f1f09.

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 6870-48S6CQ-EI-A
Device virtualization	iStack
	M-LAG
Network virtualization	VXLAN in routing and bridging modes

Item	CloudEngine 6870-48S6CQ-EI-A
	BGP-EVPN
	QinQ access VXLAN
SDN	iMaster NCE-Fabric
Network convergence	FCoE
	DCBX, PFC, ETS
	RDMA and RoCE (RoCEv1 and RoCEv2)
Programmability↵	Programming on the OPS
	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
	MUX VLAN
	GVRP
	Dynamic learning and aging of MAC addresses
	Static, dynamic, and blackhole MAC address entries
	Packet filtering based on source MAC addresses
	MAC address limiting based on ports and VLANs
IP routing	IPv4 routing protocols, such as RIP, OSPF, BGP, and IS-IS
	IPv6 routing protocols, such as RIPng, OSPFv3, IS-ISv6, and BGP4+
IPv6	IPv6 Neighbor Discovery (ND)
	IPv6 VXLAN over IPv4
	Path MTU Discovery (PMTU)
	TCP6, IPv6 ping, IPv6 tracert, IPv6 socket, UDP6, and raw IPv6↵
Multicast	IGMP, PIM-SM, PIM-DM, MSDP, and MBGP
	IGMP snooping
	Fast leaving of multicast member interfaces
	Multicast traffic suppression
	Multicast VLAN
	Multicast VXLAN
Reliability	LACP
	STP, RSTP, VBST, and MSTP
	BPDU protection, root protection, and loop prevention

Item	CloudEngine 6870-48S6CQ-EI-A
	Smart Link and multi-instance
	DLDP
	ERPS (G.8032)
	VRRP, VRRP load balancing, and BFD for VRRP
	BFD for BGP/IS-IS/OSPF/Static route
QoS	Traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p priority
	Actions of ACL, CAR, re-marking, and scheduling
	Queue scheduling algorithms, including PQ, WFQ, and PQ+WFQ
	Congestion avoidance mechanisms, including WRED and tail drop
	Traffic shaping
O&M	Network-wide path detection
	Telemetry
	Statistics on the buffer microburst status
	VXLAN OAM: VXLAN ping, VXLAN tracert
Configuration and maintenance	Console, Telnet, and SSH terminals
	Network management protocols, such as SNMPv1/v2c/v3
	File upload and download through FTP and TFTP
	BootROM upgrade and remote upgrade
	802.3az Energy Efficient Ethernet (EEE)
	Hot patches
	User operation logs
	User operation logs
	ZTP
Security and management	Command line authority control based on user levels, preventing unauthorized users from using commands
	DoS, ARP, and ICMP attack defenses
	Port isolation, port security, and sticky MAC
	Binding of the IP address, MAC address, interface number, and VLAN ID
	Authentication methods, including AAA, RADIUS, and HWTACACS
	Remote Network Monitoring (RMON)

Performance and Scalability

Item	CloudEngine 6870-48S6CQ-EI-A
Maximum number of MAC address entries	750K

Item	CloudEngine 6870-48S6CQ-EI-A
Maximum number of routes (FIB IPv4/IPv6)	380K/128K
ARP size	750K
Maximum number of VRFs	4096
IPv6 ND table size	96K
Maximum number of multicast routes (multicast FIB IPv4/IPv6)	32K/8K
Maximum VRRP groups	1024
Maximum number of ECMP paths	128
Maximum number of ACLs	20K (ingress/egress sharing)
Maximum number of broadcast domains	32K
Maximum number of BDIF	32K
Maximum number of virtual tunnel endpoints (VTEPs)	2K
Maximum number of LAGs	1024/512/256
Maximum number of links in a LAG	16/32/64
Maximum number of MSTIs	64
Maximum number of VLANs where VBST can be configured	240

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

Hardware Specifications

Item		CloudEngine 6870-48S6CQ-EI-A
Physical Features	Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm
	Weight (excluding optical transceivers, power modules, and fan assemblies / including AC power modules and fan assemblies, excluding optical transceivers, kg)	5.8/8.6
	Switching capacity (Tbps)	2.16
	Forwarding performance (Mpps)	720
10GE SFP+ ports		48
100GE QSFP28 ports		6
Management interface	Out-of-band	1*GE management interface

Item		CloudEngine 6870-48S6CQ-EI-A
	management port	
	Console port	1*RJ45
	USB port	1
CPU	Main frequency (GHz)	1.5
	Number of cores	4
Storage	DRAM	4 GB
	NOR flash	64 MB
	NAND flash	4 GB
System	System buffer	8 GB
Power Supply System	Power modules	AC: 600 W DC: 1000 W HVDC: 1200 W
	Rated voltage range(V)	AC: 100 V to 240 V DC: –48 V to –60 V HVDC: 240 V to 380V
	Maximum voltage range (V)	AC: 90 V to 290 V DC: –38.4 V to –72 V HVDC: 190V to 400V
	Maximum input current	AC 600 W: 8A (100 V to 240 V) DC 1000W: 30A（-48V DCto-60V DC） HVDC 1200W: 8A
	Typical power	194 W (100% traffic load, copper cable, normal temperature, dual power modules) 240 W (100% traffic load, short-distance optical transceivers, normal temperature, dual power modules)
	Maximum power	323 W
	Frequency (AC, Hz)	50/60
Heat Dissipation	Heat dissipation mode	Air cooling
	Number of fan trays	2
	Heat dissipation airflow	Front-to-back or back-to-front airflow
	Maximum heat consumption (BTU/hr)	1191
	Long-term operating temperature (°C)	0°C to 40°C (0-1800 m) 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

Item		CloudEngine 6870-48S6CQ-EI-A
Environment specifications	Sound pressure at 27°C (dBA)	Front-to-back airflow: < 58 dBA Back-to-front airflow: < 57 dBA
	Sound pressure at 40°C (dBA)	Front-to-back airflow: < 75 dBA Back-to-front airflow: < 74 dBA
	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)	45.9
	MTTR (hour)	1.57
	Availability	0.9999960856

For details of CloudEngine 6870-48S6CQ-EI-A 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	• EN 60950-1 • EN 60825-1 • EN 60825-2 • UL 60950-1 • CSA-C22.2 No. 60950-1 • IEC 60950-1 • AS/NZS 60950-1 • GB4943
Electromagnetic Compatibility (EMC)	• EN 300386 • EN 55032: CLASS A • EN 55024 • IEC/EN 61000-3-2 • IEC/EN 61000-3-3 • FCC 47CFR Part15 CLASS A • ICES-003: CLASS A • CISPR 32: CLASS A • CISPR 24 • AS/NZS CISPR32 • VCCI- CISPR32: CLASS A • GB9254 CLASS A
Environment	• 2011/65/EU EN 50581 • 2012/19/EU EN 50419 • (EC) No.1907/2006

Certification Category	Description
	• GB/T 26572 • ETSI EN 300 019-1-1 • ETSI EN 300 019-1-2 • ETSI EN 300 019-1-3 • ETSI EN 300 753 GR63

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=EDOC1100136525&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/dcswitch/f6d91cf16df0474998087676a33fd41e.

Ordering Information

Mainframe	
CE6870-48S6CQ-EI-A	CE6870-48S6CQ-EI-A Switch (48-Port 10GE SFP+, 6-Port 100GE QSFP28, Without Fan and Power Module)
CE6870-48S6CQ-EI-A-F	CE6870-48S6CQ-EI-A Switch (48-Port 10GE SFP+, 6-Port 100GE QSFP28, 2*AC Power Module, 2*FAN Box, Port-side Exhaust)
CE6870-48S6CQ-EI-A-B	CE6870-48S6CQ-EI-A Switch (48-Port 10GE SFP+, 6-Port 100GE QSFP28, 2*AC Power Module, 2*FAN Box, Port-side Intake)

Fan box		
Part Number	Product Description	Support Product
FAN-40HA-F	Fan box (HA, Front to Back, FAN panel side	CE6870-48S6CQ-EI-A

Fan box		
	intake)	
FAN-40HA-B	Fan box (HA, Back to Front, FAN panel side exhaust)	CE6870-48S6CQ-EI-A

Power		
Part Number	Product Description	Support Product
PAC600S12-PF	600W AC Power Module (Front to Back, Power panel side intake)	CE6870-48S6CQ-EI-A
PAC600S12-PB	600W AC Power Module (Back to Front, Power panel side exhaust)	CE6870-48S6CQ-EI-A
PDC1K2S12-PB	1200W DC Power Module (Front to Back, Power panel side intake)	CE6870-48S6CQ-EI-A
PDC1K2S12-CE	1200W DC Power Module (Back to Front, Power panel side exhaust)	CE6870-48S6CQ-EI-A

Software	
CE68-LIC-VXLAN	CloudEngine 6800 VXLAN Function
CE68-LIC-TLM	CE6800 Telemetry Function
N1-CE68LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 6800
N1-CE68CFFD-SYS1Y	N1-CloudFabric Foundation SW License for CloudEngine 6800-SnS- Year
N1-CE68LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 6800
N1-CE68CFAD-SYS1Y	N1-CloudFabric Advanced SW License for CloudEngine 6800-SnS- Year
N1-CE68LIC-CFPM	N1-CloudFabric Premium SW License for CloudEngine 6800
N1-CE68CFPM-SnS1Y	N1-CloudFabric Premium SW License for CloudEngine 6800 -SnS-Year
N1-CE-F-LIC-MDCA	N1-CloudEngine Data Center Switch Multi-cloud Multi-DC Value-added Package - Fixed
N1-CEFMDCA -SnS1Y	N1-CloudEngine Data Center Switch Multi-cloud Multi-DC Value-added Package, Per Fixed device -SnS-Year

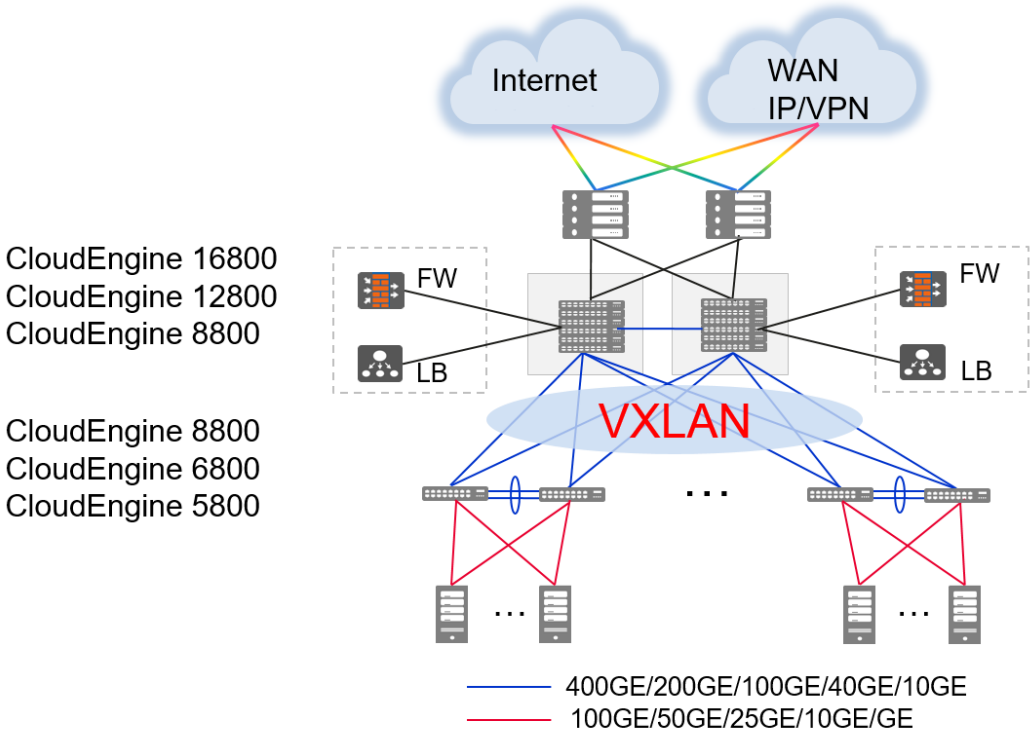
Networking and Applications

Data Center Applications

On a typical data center network that requires a large buffer, for example, a data center providing search and video services, CloudEngine 16800 switches can be used as core switches, whereas CloudEngine 6870-48S6CQ-EI-A switches can be used as ToR switches and connect to CloudEngine 16800 using 100GE ports to build a 100GE network with end-to-end large buffer capacity. The

CloudEngine 16800 and CloudEngine 6870-48S6CQ-EI-A switches use VXLAN to build a non-blocking Layer 2 network, which allows large-scale VM migrations and flexible service deployments.

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



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