Huawei CloudEngine 8800 Switch Datasheet

The CloudEngine 8800 series is a new-generation product launched by Huawei for data centers.

High-performance, high-density, and low-latency Ethernet switches.

Product Overview

Huawei CloudEngine 8800 series switches are 100G Ethernet switches designed for data centers and high-end campus networks. The switches provide high-performance, high-density 100GE/40GE ports, and low latency. Using the Huawei VRP8 software platform, CloudEngine 8800 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 8800 series switches can work with CloudEngine 16800/CloudEngine 8800/CloudEngine 6800/CloudEngine 5800 switches to build an elastic, virtualized, high-quality fabric that meets the requirements of cloud-computing data centers.

CloudEngine 8800 series switches can function as core or aggregation switches on data center networks to help enterprises and carriers build a scalable data center network platform in the cloud computing era. They can also be used as aggregation or core switches for enterprise campus networks.

Product Appearance

CloudEngine 8850-64CQ-EI provides 64*100GE QSFP28 ports.

Product Characteristics

High-Density 100GE/40GE Aggregation and Outstanding Switching Capacity

- The CloudEngine 8850-64CQ-EI provides 12.8 Tbps switching capacity, forwarding performance of 4,482 Mpps, and supports L2/L3 line-speed forwarding.
- The CloudEngine 8850-64CQ-EI provides a maximum of 64*100GE QSFP28 or 64*40GE QSFP+ ports, and can function as the core or aggregation switch on a data center or campus network.

Network-Wide Reliability, Ensuring Zero Service Interruptions

- The CloudEngine 8800 series switches 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 can be upgraded independently. During the upgrade, other switches in the system take over traffic forwarding to ensure uninterrupted services.
- 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-L AG and then finally to coupling-free M-LAG Lite. This achieves active-active server access and high reliability during switch upgrade.

Programmable Network Device, Flexible Customization

- The CloudEngine 8800 series switches 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.
- The OPS provides seamless integration of data center service and network in addition to a service-oriented, software-defined networking (SDN).

Virtualized Gateway Achieves Fast Service Deployment

- The CloudEngine 8800 series switches can work with a mainstream virtualization platform. As the high performance, hardware gateway of an overlay network (VXLAN), the CloudEngine 8800 series switches can support more than 16 million tenants.
- The CloudEngine 8800 series switches can connect to a cloud platform through an open API to provide unified management of software and hardware networks.
- This function implements fast service deployment without changing the customer network. It also protects customer investments.

Standard Interfaces, Enabling Openness and Interoperability

- CloudEngine 8800 series support NETCONF and can work with Huawei iMaster NCE-Fabric.
- CloudEngine 8800 series support Ansible-based automatic configuration and open-source module release, expanding network functions and simplifying device management and maintenance.
- CloudEngine 8800 series can be integrated into mainstream SDN and cloud computing platforms flexibly and quickly.

ZTP, Implementing Automatic O&M

- The CloudEngine 8800 series switches support Zero Touch Provisioning (ZTP). ZTP enables the CloudEngine 8800 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.

Intelligent Lossless DCN, Improving Reliability of High-Performance Computing

- In a distributed system, RoCE technology becomes the mainstream. To ensure the throughput and meet strict requirements on packet loss, Huawei ultra-fast Ethernet provides forwarding capabilities with high throughput, high reliability, and low latency for the distributed system, which is 25% lower than the average latency in the industry.
- The CloudEngine 8850-64CQ-EI switches support Integrated Network and Computing (INC), improving the computing efficiency in the HPC small-sized packet scenario

FabricInsight-based Intelligent O&M

- The CloudEngine 8800 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 8800 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

- The CloudEngine 8800 series switches use a front-to-back/back-to-front airflow design that isolates cold air channels from hot air channels. This design meets heat dissipation requirements in data center equipment rooms.
- Air can flow from front to back or back to front 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

- The CloudEngine 8800 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, Simplifying Maintenance

Clear indicators

- Port indicators clearly show the port status and port rate. The 40GE port indicators can show the states of all ports derived from the 40GE ports.
- State and stack indicators on both the front and rear panels enable users to maintain the switch from either side.
- The CloudEngine 8800 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 8800 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 8800 Series		Management	Foundation	Advanced	Premium	AI Fabric Function	AI Fabric for the HPC	Multi-cloud Multi-DC

Product	Feature	N1 Mandatory Software Packages				N1 Add on Software Packages		
Switch						Package	Scenarios	
	Basic software	√	√	√	√			
	IPV6	√	√	√	√			
	VXLAN	√	√	√	√			
	Lossless upgrade	√	√	√	√			
	Telemetry		√	√	√			
	PTP		√	√	√			
	MPLS			√	√			
	LLETH					√		
	INC						√	
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 (Intelligent O&M 1-3-5)			√	√			
	Value-added functions for network traffic analysis (managing 100 VMs)				√			
Version Mapping		Select one from the three options. The Foundation software package contains functions from the Management software package, and the Advanced software package contains functions from the Foundation software package.				It is used with the Management, Foundation, Advanced or Premium 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 8850-64CQ-EI
Device virtualization	iStack
	M-LAG
Network virtualization	VXLAN routing and bridging
	BGP-EVPN
	QinQ access VXLAN
Data center interconnect	VXLAN mapping, implementing interconnection between multiple DCI networks at Layer 2
SDN	iMaster NCE-Fabric
Network convergence	DCBX, PFC, ETS
	RDMA and RoCE (RoCE v1 and RoCE v2)
Programmability	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
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)
	IPv6 VXLAN over IPv4
	Path MTU Discovery (PMTU)
	TCP6, IPv6 ping, IPv6 tracert, IPv6 socket, UDP6, and Raw IP6

Item	CloudEngine 8850-64CQ-EI
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
	Multicast VXLAN
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
	Traffic classification based on Layer 2 headers, Layer 3 protocols, Layer 4 protocols, and 802.1p information
QoS	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
	Network-wide path detection
Intelligent O&M	PTP-IEEE 1588v2
	Telemetry
	Statistics on the buffer microburst status
	VXLAN OAM: VXLAN ping and VXLAN tracert
	Intelligent Traffic Analysis
	Dynamic ECN, Fast CNP, Dynamic load balancing (DLB), RoCE flow visibility INC
Intelligent and Lossless Network	Console, Telnet, and SSH terminals
Configuration and maintenance	Network management protocols, such as SNMPv1/v2/v3
	File upload and download through FTP and TFTP

Item	CloudEngine 8850-64CQ-EI
	BootROM upgrade and remote upgrade
	802.3az Energy Efficient Ethernet (EEE)
	Hot patches
	User operation logs
	Zero Touch Provisioning (ZTP)
	Command line authority control based on user levels, preventing unauthorized users from using commands
Security and management	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 8850-64CQ-EI
Maximum number of MAC address entries	264K
Maximum number of Forwarding routes (FIB IPv4/IPv6)	360K/256K
ARP table size	156K
Maximum number of VRF	2048
IPv6 ND (Neighbor Discovery) table size	48K
Maximum Number of multicast routes (Multicast FIB IPv4/IPv6)	8K/2K
Maximum VRRP groups	1000
Maximum number of ECMP paths	128
Maximum Number of broadcast domains	8K
Maximum number of BDIF	4K
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
Maximum number of PTP slaves	64

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

Hardware Specifications

Item		CloudEngine 8850-64CQ-EI
Physical Features	Dimensions (W × D ×H, mm)	442*600*86.1
	Weight (excluding optical modules, power modules, and fan assemblies/ including AC power modules and fan assemblies, excluding optical modules, kg)	12 /16.4
	Switching capacity (Tbps)	12.8
	Forwarding performance (Mpps)	4482
Ports		64*100GE QSFP28,
Card	Number of card slots	0
	Card type	Fixed card
	Card Specification	NA
Management interface	Out-of-band management port	GE RJ45 management interfaces
	Console port	RJ45 interface + MiniUSB interface (multiplexing)
	USB port	1
CPU	Main frequency (GHZ)	1.5
	Number of cores	8
Storage	RAM	4GB
	NOR Flash	64MB
	NAND Flash	4GB
System	System buffer	42MB
Power Supply System	Power modules	1200 W AC&240 V DC power module 1200 W DC power module
	Rated voltage range(V)	1200 W AC&240 V DC power module: 100 V AC to 240 V AC, 50/60 Hz; 240 V DC 1200 W DC power module: –48 V DC to –60 V DC; +48 V DC
	Maximum voltage range(V)	1200 W AC&240 V DC power module: 90 V AC to 290 V AC, 45 Hz to 65 Hz; 190 V DC to 290 V DC 1200 W DC power module: -38.4 V DC to -72 V DC; +38.4 V DC to +72 V DC
	Maximum input current	1200 W AC&240 V DC power module: 10 A (100 V AC to 130 V AC); 8 A (200 V AC to 240 V AC); 8 A (240 V DC) 1200 W DC power module: 38 A (–48 V DC to –60 V DC); 38 A (+48 V DC)
	Typical power	455W
	Maximum power	965W
	Frequency (AC, HZ)	50/60

Item		CloudEngine 8850-64CQ-EI
Heat Dissipation	Heat dissipation mode	Air cooling
	Number of fan trays	3
	Heat dissipation airflow	Front-to-back or back-to-front airflow
	Maximum heat consumption (BTU/hr)	1031
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
	Normal temperature 27°C noise (Sound pressure) (dBA)	Front-to-back airflow: 61.5 in average (maximum: 65.9) Back-to-front airflow: 61.3 in average (maximum: 66.5)
	High temperature 40°C noise (Sound pressure) (dBA)	Front-to-back airflow: 82.5 in average (maximum: 87.4) Back-to-front airflow: 79.7 in average (maximum: 85.6)
	Surge protection	AC: 6 kV in common mode and 6 kV in differential mode DC: 4 kV in common mode and 2 kV in differential mode HVDC: 4 kV in common mode and 2 kV in differential mode
Reliability	MTBF (year)	20.71
	MTTR (hour)	1.85
	Availability	0.999992477

Note: For detailed information of CloudEngine 8800 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

Certification Category	Description
	• 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 • 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	
CE8850-EI-F-B0B	CE8850-64CQ-EI Switch (64-Port 100GE QSFP28,2*AC Power Module,3*FAN Box, Port-side Exhaust)
CE8850-EI-B-B0B	CE8850-64CQ-EI Switch (64-Port 100GE QSFP28,2*AC Power Module,3*FAN Box, Port-side Intake)
CE8850-64CQ-EI	CE8850-64CQ-EI Switch (64-Port 100GE QSFP28, Without Fan and Power Module)

Fan box		
Model	Description	Applicable Product
FAN-180A-F	Fan box (F, FAN panel side intake)	CE8850-64CQ-EI
FAN-180A-B	Fan box (B, FAN panel side exhaust)	CE8850-64CQ-EI

Power		
Model	Description	Applicable Product
PHD-1K2WA-F	1200W HVDC Power Module (Power panel side intake)	CE8850-64CQ-EI
PHD-1K2WA-B	1200W HVDC Power Module (Power panel side exhaust)	CE8850-64CQ-EI
PDC-1K2WA-B	1200W DC Power Module (Power panel side intake)	CE8850-64CQ-EI
PDC-1K2WA-F	1200W DC Power Module (Power panel side exhaust)	CE8850-64CQ-EI
PAC1K2S12-PB	1200W AC&240V DC Power Module (Back to Front,Power panel side air-out)	CE8850-64CQ-EI
PAC1K2S12-PF	1200W AC&240V DC Power Module (Front to Back,Power panel side intake)	CE8850-64CQ-EI

Software	
CE88-LIC-VXLAN	CloudEngine 8800 VXLAN Function
CE88-LIC-BUN01	CE8800 Function License Bundle 1
CE88-LIC-TLM	CE8800 Telemetry Function
CE88-LIC-PTP	CE8800 Precision Time Protocol Function
CE88-LIC-AIF	CloudEngine 8800 AI Fabric Function
N1-CE88LIC-CFMM	N1-CloudFabric Management SW License for CloudEngine 8800
N1-CE88CFMM-SnS1Y	N1-CloudFabric Management SW License for CloudEngine 8800 -SnS-1 Year

Software	
N1-CE88LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 8800
N1-CE88CFFD-SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine 8800-SnS-1 Year
N1-CE88LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 8800
N1-CE88CFAD-SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine 8800-SnS-1 Year
N1-CE88LIC-CFPM	N1-CloudFabric Premium SW License for CloudEngine 8800
N1-CE88CFPM-SnS1Y	N1-CloudFabric Premium SW License for CloudEngine 8800 -SnS-Year
N1-CE88LIC-AIF	N1-CloudEngine 8800 AI Fabric Function
N1-CE88AIF- SnS1Y	N1-CloudEngine 8800 AI Fabric Function-SnS-1 Year
N1-CE88LIC-HPC	N1-CloudEngine 8800 AI Fabric Value-added Package for the HPC Scenarios (Supported only by CE8850-64CQ-EI)
N1-CE88HPC-SnS1Y	N1-CloudEngine 8800 AI Fabric Value-added Package for the HPC Scenarios-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 Application

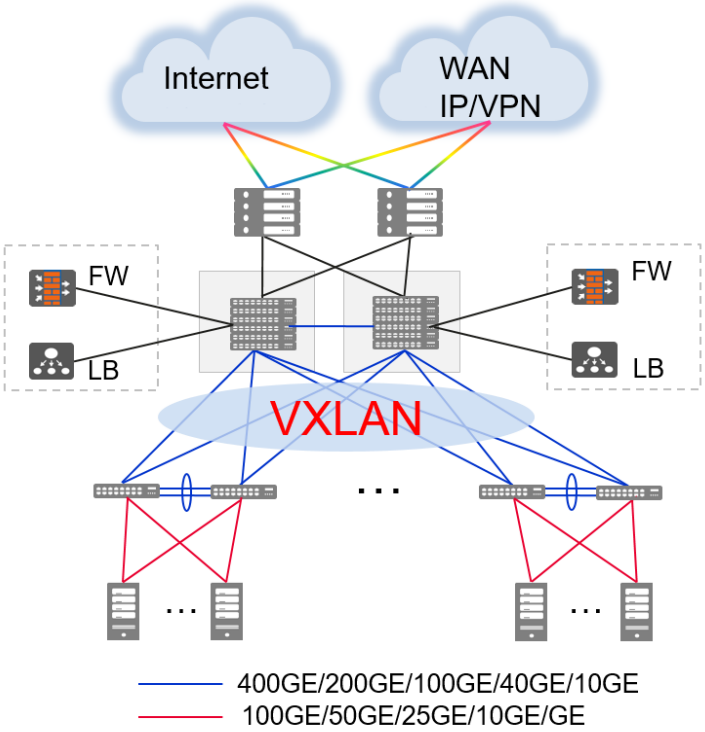
Data Center Applications

On a typical data center network, CloudEngine 16800/12800/8800 switches work as core switches, whereas CloudEngine 6800 and CloudEngine 5800 switches work as ToR switches and connect to the core switches using 100GE/40GE/10GE ports. These switches use fabric technology

such as VXLAN to establish a nonblocking large Layer 2 network, which allows large-scale VM migrations and flexible service deployments.

CloudEngine 16800
CloudEngine 12800
CloudEngine 8800

CloudEngine 8800
CloudEngine 6800
CloudEngine 5800



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

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