Huawei CloudEngine 8855 Data Center Switch Datasheet

Huawei CloudEngine 8855 series switches are next-generation high-performance and high-density 100GE access switches designed for data centers (DCs), and provide 400GE uplink ports.

Overview

- Huawei CloudEngine 8855 series switches are next-generation high-performance and high-density 100GE access switches designed for DCs.
- CloudEngine 8855 series switches have an advanced hardware structure design, and provide high-density 100GE port access and 400GE uplink ports. The switches support extensive DC features and flexible selection of the airflow direction.
- CloudEngine 8855 series switches can work with CloudEngine 16800, 16800-X, or 8800 DC core switches to build an elastic, virtualized, high-quality, and fully-connected 100GE/200GE/400GE data center network (DCN), meeting network requirements of DCs in the cloud era.
- CloudEngine 8855 series switches provide high-density 100GE access in DCs to build DCN platforms for enterprises and carriers in the cloud era. The switches can also work as core or aggregation switches on campus networks.
- Using Huawei's innovative system platform, CloudEngine 8855 is designed with component-based system architecture, which support separation of process and kernel, and support independent maintenance and upgrade of components.

Product Model and Appearance

Appearance	Description
CloudEngine 8855-48CD8DQ  **Port side**  **Fan and power supply side**	• 48 x 100GE DSFP56 • 8 x 400GE QSFP-DD

Features

High-Density Access, Providing Superior Capacity

- A CloudEngine 8855 series switch supports up to 48 x 100GE ports, ensuring high-density 100GE server access.
- A CloudEngine 8855 series switch supports up to 8 x 400GE high-performance QSFP-DD ports. Each 400GE QSFP-DD port can automatically adjust its rate to 100 or 200 Gbit/s , and can be split into two 200GE or four 100GE ports. The CloudEngine 8855 switch can connect to the CloudEngine 16800-X, 16800, or 8800 series switches through 100GE/200GE/400GE uplinks to build a non-blocking network platform.

Inter-Device Link Aggregation, Ensuring High Efficiency and Reliability

- CloudEngine 8855 series switches support Multichassis Link Aggregation Group (M-LAG) to implement link aggregation among multiple devices, improving link reliability from the card level to the device level.
- Switches in an M-LAG 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.

Virtualized Hardware Gateway, Achieving Rapid Deployment

- CloudEngine 8855 series switches can work with the industry's mainstream virtualization platforms. When functioning as high-performance hardware gateways on an overlay network (VXLAN), CloudEngine 8855 series switches can support the operations of a DC with up to 16 million tenants.
- When functioning as hardware gateways on an overlay network, CloudEngine 8855 series switches can connect to cloud platforms through open APIs, facilitating unified management of virtual and physical networks.
- The hardware virtualized gateway solution achieves rapid service deployment without having to change the customer network, protecting customer investments.
- CloudEngine 8855 series switches support Border Gateway Protocol - Ethernet VPN (BGP-EVPN), which can run as the VXLAN control plane to simplify VXLAN configuration within and between DCs.

Standard Interfaces, Enabling Open Interconnection

- CloudEngine 8855 series switches support NETCONF and can interconnect with iMaster NCE-Fabric.
- CloudEngine 8855 series switches support Ansible — an automatic management and O&M tool — to implement unified provisioning of physical and virtual networks.
- CloudEngine 8855 series switches are integrated with mainstream cloud platforms (including commercial and open-source cloud platforms) and third-party controllers, enabling flexible service customization and automatic management.

Zero Touch Provisioning, Enabling Automatic O&M

- CloudEngine 8855 series switches support Zero Touch Provisioning (ZTP). ZTP enables the switches to automatically obtain and load version files from a file server, freeing network engineers from onsite configuration and deployment. ZTP reduces labor costs and improves device deployment efficiency.
- ZTP supports embedded script languages and provides them for users through open APIs. DC users can use a familiar programming language (such as Python) to centrally configure network devices.
- ZTP decouples the configuration time of new devices from device quantity and geographical distribution, shortening the service provisioning time and improving the service provisioning efficiency.

Intelligent O&M Through Collaboration with iMaster NCE-FabricInsight

- CloudEngine 8855 series switches support telemetry technology to collect device data in real time and send the collected data to iMaster NCE-FabricInsight — the DCN analysis component of Huawei iMaster NCE. Leveraging the intelligent fault identification algorithm, iMaster

NCE-FabricInsight can analyze network data, accurately display the real-time network status, locate faults and identify their root causes in a timely and effective manner, and detect network problems that can affect user experience, precisely guaranteeing user experience.

- CloudEngine 8855 series switches support insertion of IFIT extension headers into packets, path visualization, and interfacelevel analysis of packet loss, traffic, and latency. This helps to achieve high-precision service-level packet loss detection and facilitate fault demarcation.
- CloudEngine 8855 series switches support Packet Event. When a device discards packets due to reasons such as abnormal forwarding, specified packet discarding rules, a full buffer, or ACL rule deny actions, or when the latency of packets exceeds a specified threshold, the device reports related flow entries to the iMaster NCE-FabricInsight collector.

Simplified DCN Deployment via Collaboration with iMaster NCE-Fabric

- CloudEngine 8855 series switches can interconnect with iMaster NCE-Fabric through standard protocols such as NETCONF and SNMP to adapt to networks and implement automatic network management. This helps to provide more efficient and intelligent operation methods, simplifying network management, and reducing the OPEX.

Intelligent Lossless Network, Meeting High Performance Requirements of RoCEv2 Applications

- CloudEngine 8855 series switches support the iLossless algorithm to eliminate packet loss on the conventional Ethernet. This helps to build a lossless, low-latency, and high-throughput network environment for RoCEv2 traffic, meeting high performance requirements of RoCEv2 applications.
- CloudEngine 8855 series switches support PFC deadlock prevention. The switches can identify service flows that may cause PFC deadlocks and change queue priorities of these flows to prevent PFC deadlocks.
- CloudEngine 8855 series switches support Artificial Intelligence Explicit Congestion Notification (AI ECN). This futureoriented function can intelligently adjust the ECN thresholds of lossless queues based on the live-network traffic model to ensure low latency and high throughput with zero packet loss, maximizing the performance of lossless services.
- CloudEngine 8855 series switches support ECN Overlay. ECN Overlay applies ECN to a VXLAN network, enabling the traffic receiver to detect congestion on the overlay network in a timely manner and instruct the traffic sender to reduce its packet sending rate to relieve network congestion.

Large throughput in AI scenarios, fully releasing computing power

- CloudEngine 8855 series switches support NSLB enhancement (network-level load balancing), achieving a maximum of 98% throughput on the entire network in AI scenarios and improving AI training efficiency.

Flexible Airflow Design, Improving Energy Efficiency

Flexible front to back/back to front airflow design:

- CloudEngine 8855 series switches use a strict front-to-rear airflow design that isolates cold air channels from hot air channels, meet heat dissipation requirements in DC equipment rooms.
- Air can flow from front to rear or from rear to front depending on the fan modules and power modules in use.
- Redundant power modules and fan modules can be configured to ensure service continuity.

Innovative energy-saving technologies:

- CloudEngine 8855 series switches use energy-saving chips and an intelligent fan speed control scheme to measure system power consumption in real time. This can reduce O&M costs and help to build a green DC.

Clear Indicators, Simplifying O&M

Clear indicators:

- The innovative port indicators can clearly show the port status, port speed, and status of all sub-interfaces.
- State and stack indicators on both the front and rear panels enable users to maintain the switch from either side.
- CloudEngine 8855 series switches support remote positioning. Users can turn on the remote positioning indicator through the network management system (NMS) or console to easily identify the switches they want to maintain in an equipment room full of devices.

Simple maintenance:

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

License Authorization

CloudEngine 8855 series switches support the CloudFabric IDN One Software (N1) business model, which bundles iMaster NCEFabric, iMaster NCE-FabricInsight, and CloudEngine switches in a range of typical scenarios. This approach simplifies transactions, provides customers with more functions and value, and protects customers' software investment through Software License Portability.

Feature	1 Software Package (Mandatory)			N1 Add-On Package (Optional)									
	Foundation	Advanced	Premium	TCP Acceleration	Distributed storage	HPC	AI	Security	Multi-Cloud and Multi-DC	Specified Flow Analysis	xFlow Intelligent Full-flow Analysis	Financial grade High Availability	Digital Map
Basic functions (including IPv6 and VXLAN)	●	●	●										
Telemetry	●	●	●										
PTP	●	●	●										
Multicast NAT		●	●										
M-LAG virtual peer-link	●	●	●										
MACsec								●					
AI ECN 2.0					●	●							
TCP optimization				●	●	●	●						
NSLB						●	●						
NSLB enhanced							●						
MoFRR												●	
in-network computing						●							
Adaptive routing						●							
Automation	●	●	●										
Basic intent functions			●										
Runbook		●	●										
Multi-cloud and multi-DC automation									●				
Basic digital map functions													●
Basic network analysis functions	●	●	●										
Network health evaluation		●	●										
Value-added functions of network traffic analysis (100 VMs)			●							●			
IFIT service assurance											●		
Value-added functions of network traffic analysis (1000 VMs)		●	●										

Value-added package of multi-cloud and multi-DC analysis scenarios									•				
Version mapping	Select one from the three packages. The Advanced package contains features of the Foundation package, and the Premium package contains the features of the Advanced package.			Used together with the Foundation, Advanced, or Premium package.									

Product Specifications

Item	CloudEngine 8855-48CD8DQ
Device virtualization	M-LAG
Network virtualization	VXLAN routing and VXLAN bridging
	BGP-EVPN
SDN	iMaster NCE-Fabric
Network convergence	PFC and AI ECN
	RDMA and RoCE (RoCE v1 and RoCE v2)
Programmability	OpenFlow
	OPS programming
Traffic analysis	NetStream
VLAN	Access, trunk, and hybrid ports
	Default VLAN
MAC address table	Automatic MAC address learning and aging
	Static, dynamic, and blackhole MAC address entries
	Source MAC address filtering
	MAC address learning limiting based on ports and VLANs
IP routing	IPv4 dynamic routing protocols such as RIP, OSPF, IS-IS, and BGP
	IPv6 dynamic routing protocols such as RIPng, OSPFv3, IS-ISv6, and BGP4+
IPv6	VXLAN over IPv6
	IPv6 VXLAN over IPv4

	IPv6 neighbor discovery (ND)
	Path MTU discovery (PMTU)
	TCP6, IPv6 ping, IPv6 tracert, IPv6 socket, UDP6, and raw IPv6
Multicast	Multicast routing protocols such as IGMP, PIM-SM, and MSDP
	IGMP snooping and IGMP proxy
	IPv6 Layer 3 multicast and configuration of both Layer 2 and Layer 3 multicast services
	Fast leave of multicast member interfaces
	Multicast traffic suppression

Reliability	DPFR
	DPCF
	LACP
	STP, RSTP, VBST, and MSTP
	BPDU protection
	Smart link and multi-instance
	Hardware-based Bidirectional Forwarding Detection (BFD), with a minimum packet sending interval of 3 ms
	VRRP, VRRP load balancing, and BFD for VRRP
	BFD for BGP, IS-IS, OSPF, and static routing
	BFD for VXLAN
QoS	Traffic classification based on Layer 2 headers, Layer 3 protocols, and Layer 4 protocol priorities
	ACL, CAR, re-marking, and scheduling
	Queue scheduling modes such as PQ, DRR, and PQ+DRR
	Congestion avoidance mechanisms such as WRED and tail drop
	Traffic shaping
	IEEE 1588v2
Intelligent O&M	Network-wide path detection

	Telemetry
	Enhanced ERSPAN
	IFIT
	Packet Event: packet loss visualization and ultra-long latency visualization
	Statistics collection on the buffer microburst status
	VXLAN OAM: VXLAN ping and VXLAN tracert
Intelligent lossless network	PFC deadlock prevention
	AI ECN
	ECN Overlay
	Enhanced NSLB
Configuration and maintenance	Terminal login through the console port, Telnet, and SSH
	Network management protocols, such as SNMPv1/v2/v3
	File upload and download through FTP and TFTP
	Boot Read-Only Memory (BootROM) upgrade and remote online upgrade
	Hot patches
	User operation logs
	Configuration rollback
	ZTP
Security and management	MACsec
	Command line authority control based on user levels, preventing unauthorized users from using commands
	Defense against DoS, ARP, and ICMP attacks
	Port isolation, port security, and sticky MAC
	Binding of the IP address, MAC address, port ID, and VLAN ID
	Authentication methods, including AAA, LDAP, RADIUS, and HWTACACS
	RMON

Performance and Scalability

Item	Value
Maximum number of MAC address entries	640K
Maximum number of routes (FIB IPv4/IPv6)	1.5M/750K
ARP size	128K
Maximum number of VRFs	4096
IPv6 ND table size	128K
Maximum number of multicast routes (multicast FIB IPv4/IPv6)	32K/16K
Maximum number of VRRP groups	1024
Maximum number of ECMP paths	128
Maximum number of VXLAN bridge domains	16K
Maximum number of BDIF interfaces	16K
Maximum number of VXLAN tunnels	5K
Maximum number of LAGs	1024
Maximum number of links in a LAG	256

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

Hardware Specifications

Item		CloudEngine 8855-48CD8DQ
Physical features	Dimensions (H x W x D)	43.6 mm x 442.0 mm x 420.0 mm
	Weight without packaging (full configuration) [kg (lb)]	8.31
	Switching capacity (Tbps)	16
	Forwarding performance (Mpps)	2400
100GE DSFP56 port		48
400GE QSFP-DD port		8

Buffer	System Buffer	64 MB
Power supply	Power modules	1200 W power module: 1200 W
	Rated input voltage [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
	Input 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	442 W (100% traffic load, short-distance optical modules on 24 x 100G + 4 x 400G ports, normal temperature, dual AC power modules) 620 W (100% traffic load, short-distance optical modules on 48 x 100G + 8 x 400G ports, normal temperature, dual AC po wer modules) 838 W (100% traffic load, long-distance optical modules on 48 x 100G + 8 x 400G ports, normal temperature, dual AC po wer modules)
	Maximum power	1020 W
	Power factor	0.90 @ 15%–25% load 0.96 @ 25%–50% load 0.98 @ 50%–100% load
	Frequency (AC, Hz)	50/60
Heat dissipation	Heat dissipation mode	Air cooling
	Number of fans	6
	Heat dissipation airflow	Front-to-back or back-to-front airflow
Environment	Long-term operating	0°C to 40°C (0-1800 m)
specifications	temperature (°C)	The temperature decreases by 1°C each time the altitude increases by 220 m.
	Storage temperature (°C)	-40°C to +70°C
	Storage relative humidity (RH)	5% to 95%
	Operating altitude (m)	Up to 5000

	Noise at normal temperature (27°C, sound pressure) (dBA)	Front-to-back airflow: 52.6 dB(A) on average; maximum: 57.2 dB(A) Back-to-front airflow: 53.6 dB(A) on average; maximum: 59.0 dB(A)
	Noise at high temperature (40°C, sound pressure) (dBA)	Front-to-back airflow: 71.5 dB(A) on average; maximum: 77.3 dB(A) Back-to-front airflow: 69.7 dB(A) on average; maximum: 75.6 dB(A)
	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)	27.77
	MTTR (hour)	2
	Availability	0.999991779

Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of CloudEngine 8800 series switches.

Certification Category	Description
Safety	EN 62368-1 IEC 62368-1 UL 62368-1 CSA-C22.2 No.62368-1 AS/NZS 62368-1 GB4943
Electromagnetic Compatibility (EMC)	EN 300386 EN 55032 EN 55035 IEC/EN 61000-3-2 IEC/EN 61000-3-3 AS/NZS CISPR32 FCC 47CFR Part15 ICES-003 CISPR 32 CISPR 24 VCCI- CISPR32 CISPR35 GB9254

Environment	EN 50581 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

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

Ordering Information

Device Description	
CE8855-48CD8DQ	CE8855-48CD8DQ switch (48*100GE DSFP56, 8*400GE QSFP-DD,Without Fan and Power Modules)
CE8855-48CD8DQ-B	CE8855-48CD8DQ switch (48*100GE DSFP56, 8*400GE QSFP-DD,2*AC Power Modules,6*Fans, Port-side Intake)
Fan module	
Model	**Description**
FAN-040B-B	Fan box (B,FAN panel side exhaust)
Power module	
Model	**Description**
PAC1K2S12-PB	1200W AC&240V DC Power Module (Back to Front,Power panel side exhaust)

Software	
N1-CE88LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 8800
N1-CE88CFFD- SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine 8800-SnS-Year
N1-CE88LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 8800
N1-CE88CFAD- SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine 8800-SnS-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-CE88UPG-F-A	N1-CloudEngine 8800 Upgrade SW License:Foundation to Advanced
N1-CE88UGFA- SnS1Y	N1-CloudEngine 8800 Upgrade SW License:Foundation to Advanced-SnS-Year
N1-CE88UPG-A-P	N1-CloudEngine 8800 Upgrade SW License:Advanced to Premium
N1-CE88UGAP- SnS1Y	N1-CloudEngine 8800 Upgrade SW License:Advanced to Premium-SnS-Year
N1-CE88LIC-AFRD-2	N1-CloudEngine 8800 AI Fabric RDMA Application Acceleration Function 2
N1-CE88AFRD2-SnS1Y	N1-CloudEngine 8800 AI Fabric RDMA Application Acceleration Function 2-SnS-Year
N1-CE88LIC-HPC	N1-CE88LIC-HPC,N1-CloudEngine 8800 AI Fabric Value-added Package for the HPC Scenarios
N1-CE88HPC-SnS1Y	N1-CloudEngine 8800 AI Fabric Value-added Package for the HPC Scenarios-SnS-1 Year,
N1-CE88LIC-AI	N1-CloudEngine 8800 Value-added Package for the AI Scenarios
N1-CE88AI-SnS1Y	N1-CloudEngine 8800 Value-added Package for the AI Scenarios-SnS Year
N1-CE88LIC-SEC	N1-CloudEngine 8800 Security Function
N1-CE88SEC-SnS1Y	N1-CloudEngine 8800 Security Function-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
N1-CE-F-LIC-DM	N1-CloudEngine Digital Map Basic Function-Fixed
N1-CEFDM-SnS1Y	N1-CloudEngine Digital Map Function
N1-CE-LIC-AFP100VM	N1-CloudEngine Specified Flow Analysis Value-added Package Per 100 VM
N1-CEAFP100VM-SnS1Y	N1-CloudEngine Specified Flow Analysis Value-added Package Per 100 VM-SnS-Year

Networking Application

Application in a DC

On a typical DCN, CloudEngine 16800-X, 16800 or 9800 switches work as core switches, and CE6800 or CE8800 work as TOR switches and connect to the core switches through 40GE, 100GE, 200GE or 400GE ports to build an end-to-end and fullyconnected 40GE/100GE/200GE/400GE network. The switches use VXLAN and other fabric technologies to establish a non-blocking large Layer 2 network, which allows large-scale VM migrations and flexible service deployments.



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

More Information

For more information about Huawei products, visit https://e.huawei.com/en/ or contact Huawei's local sales office.

Alternatively, you can contact us through one of the following methods:

- Global service hotline: https://e.huawei.com/en/about/service-hotline
- Enterprise technical support website: https://support.huawei.com/enterprise/en/index.html
- Service email address for enterprise users: support_e@huawei.com

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