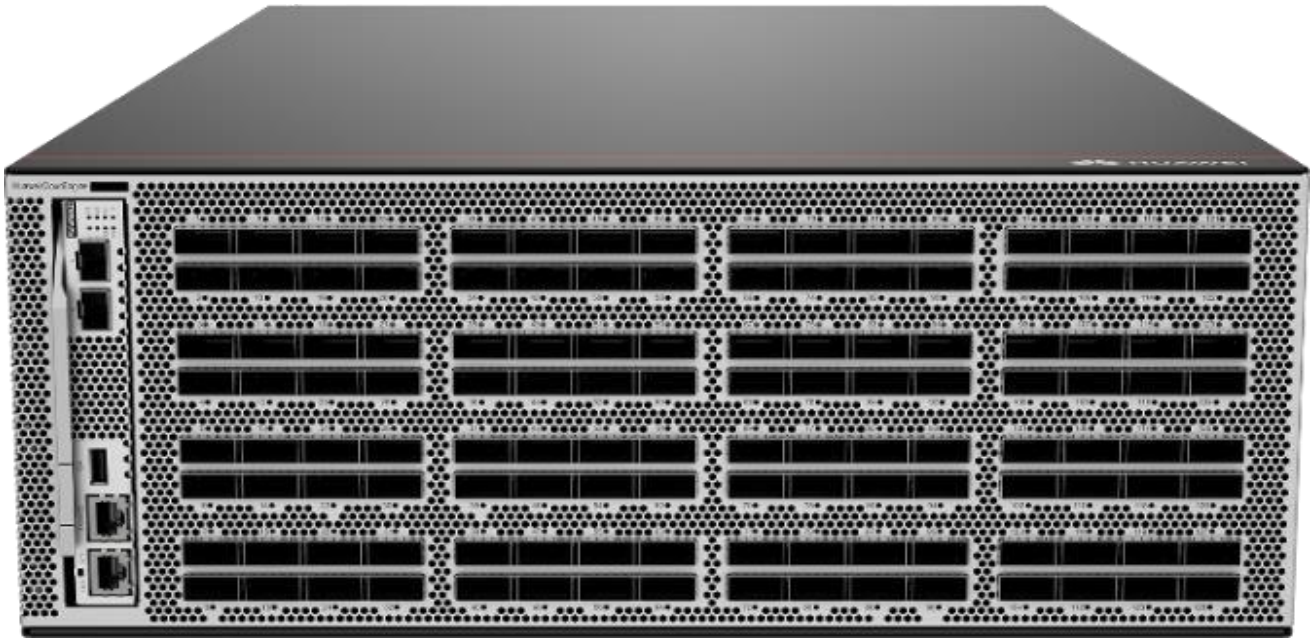
Huawei CloudEngine CE9866-128DQ Data Center Switch Datasheet

Huawei CloudEngine CE9866 series switches are next-generation high-density 400GE access switches designed for data center (DC) AI scenarios.

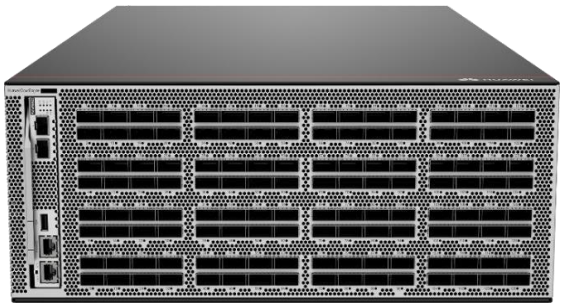
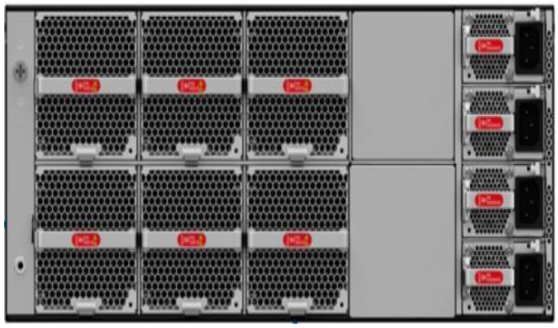


Product Overview

Huawei CloudEngine CE9866 series switches are next-generation high-performance and high-density 400GE access switches designed for DC scenarios. They have an advanced hardware architecture, offer high-density 400GE access ports, support 400GE uplink ports, and deliver a wide range of DC service features. CloudEngine CE9866 series switches can work with CE16800 series DC core switches to build an elastic, virtualized, high-quality, and fully-connected 40GE/100GE/200GE/400GE DC network (DCN), meeting network requirements of DCs in the cloud era. CloudEngine CE9866 series switches provide high-density 400GE access to help enterprises and carriers build DCNs in the cloud computing era. They can also be used as core or aggregation devices of campus networks.

Product Models and Appearances

CloudEngine CE9866 series switches contain the following model: CloudEngine CE9866-128DQ

Product Appearance	Description
 Port side  Fan module and power module side	128 x 400GE QSFP112 + 2 x 10GE SFP+ ports (uplink and downlink not distinguished)

Product Features

High-Density Access, Providing Superior Capacity

- A CloudEngine CE9866 series switch supports a maximum of 128 400GE high-performance QSFP112 ports. Each 400GE can be split into four 100GE ports or two 200GE ports. The CloudEngine CE9866 switch can connect to the CE16800 series switches through 100GE/200GE/400GE uplinks to build a non-blocking network platform.

Inter-Device Link Aggregation, Ensuring High Efficiency and Reliability

- CloudEngine CE9866 series switches support Multi-chassis 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.

Standard Ports, Enabling Open Interconnection

- CloudEngine CE9866 series switches support NETCONF and can interconnect with iMaster NCE-Fabric.
- CloudEngine CE9866 series switches support Ansible — an automatic management and O&M tool — to implement unified provisioning of physical and virtual networks.
- CloudEngine CE9866 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.

Intelligent O&M Through Collaboration with iMaster NCE-FabricInsight

- CloudEngine CE9866 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 CE9866 series switches can insert IFIT extension headers into packets, visualize paths, and analyze interface-level packet loss, traffic, and latency to implement high-precision service-level packet loss measurement and facilitate fault demarcation.
- CloudEngine CE9866 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.
- CloudEngine CE9866 series switches support application views. An application view clearly displays the applications, IP subnets, and their indicators and access relationships on the network.

Simplified DCN Deployment via Collaboration with iMaster NCE-Fabric

- CloudEngine CE9866 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 CE9866 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 CE9866 series switches support PFC deadlock prevention. They can identify service flows that may cause PFC deadlocks and change queue priorities of these flows to prevent PFC deadlocks.
- CloudEngine CE9866 series switches support Artificial Intelligence Explicit Congestion Notification (AI ECN). This future-oriented 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.

Licensing

Huawei CloudEngine CE9866 series switches support the CloudFabric Software business model, which bundles iMaster NCE-Fabric, iMaster NCE-FabricInsight, and CloudEngine series 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	N1 Software Package (Mandatory)			N1 Add-On Package (Optional)									
	Foundation	Advanced	Premium	TCP Acceleration	Distributed Storage	HPC	AI Scenario	Security	Multi-Cloud and Multi-DC	xFlow Specified Flow Analysis	xFlow Intelligent Full-Flow Analysis	Financial-Grade High Reliability	Digital Map
Basic functions (including IPv6 and VXLAN)	•	•	•										
Telemetry	•	•	•										
PTP	•	•	•										
Multicast NAT		•	•										
M-LAG virtual peer-link[1]	•	•	•										
AI ECN 2.0					•	•							
TCP optimization				•	•	•	•						
NSLB						•	•						
Enhanced NSLB							•						
MoFRR												•	
In-network computing (INC)						•							
Adaptive routing						•							
Automation functions	•	•	•										
Basic intent functions			•										
Runbook function		•	•										
Multi-cloud and multi-DC automation scenario package									•				
Basic digital map functions													•
Basic network analysis functions	•	•	•										
Network health evaluation		•	•										
Network flow analysis (100 VMs)			•							•			
Intelligent full-flow analysis (per 20 Gbps)											•		
IFIT service assurance		•	•										
Multi-cloud and multi-DC analysis scenario package									•				
Mapping relationship	Select one from the three packages. The Advanced package contains the Foundation package, and the Premium package contains the Advanced package.			Used together with the Foundation, Advanced, or Premium package.									

Product Specifications

Item	CloudEngine CE9866-128DQ
Device virtualization	M-LAG
Port	Jumbo frames
Network convergence	PFC and AI ECN
	RDMA and RoCE (RoCE v1 and RoCE v2)
Programmability	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
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	IPv6 neighbor discovery (ND)
	Path MTU discovery (PMTU)
Reliability	LACP
	STP, RSTP, VBST, and MSTP
	BPDU protection
	Hardware-based Bidirectional Forwarding Detection (BFD), with a minimum packet sending interval of 3.3 ms
	VRRP, VRRP load sharing, and BFD for VRRP
	BFD for BGP, IS-IS, OSPF, and static routing
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
Intelligent O&M	Telemetry
	Enhanced ERSPAN
	In-situ Flow Information Telemetry (IFIT)
	Packet Event: packet loss visualization and ultra-long latency visualization
	Statistics collection on the buffer microburst status

Intelligent lossless network	PFC deadlock prevention
	AI ECN
	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 patching
	User operation logs
	Configuration rollback
	ZTP
Security and management	Command line authority control based on user levels, preventing unauthorized users from using commands
	Defense against DoS, ARP, and ICMP attacks
	Port isolation
	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	8K
Maximum number of routes (FIB IPv4/IPv6)	500K/240K

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

Hardware Specifications

Item		CloudEngine CE9866-128DQ
Physical features	Dimensions (H x W x D)	442mm × 765mm × 175mm
	Weight without packaging (full configuration) [kg (lb)]	45 kg
	Switching capacity (Tbps)	102.4
	Forwarding performance (Mpps)	19000
400GE QSFP112 port		128
10GE SFP+ port		2
Management interface	Console port	1 x RJ45 interface
	USB port	1
CPU	Number of cores	16
Power supply	Power modules	2000 W AC&240 V DC power module 2000 W high-voltage DC power module
	Rated input voltage [V]	2000 W AC&240 V DC power module: AC: 100 V AC to 240 V AC, 50/60 Hz; DC: 240 V DC 2000 W high-voltage DC power module: 336 V DC
	Input voltage range [V]	2000 W AC&240 V DC power module: AC: 90 V AC to 290 V AC, 45 Hz to 65 Hz; DC: 190 V DC to 290 V DC 2000 W high-voltage DC power module: 260 V DC to 400 V DC
	Maximum input current	2000 W AC&240 V DC power module: 10 A (100 V AC to 240 V AC); 10 A (240 V DC) 2000 W high-voltage DC power module: 10 A (336 V DC)
	Typical power	1699 W (100% traffic load, short-distance optical modules on half of ports, normal temperature, 4 AC power modules)
	Maximum power	3197 W (100% traffic load, long-distance optical modules on all ports, 40°C,4 AC power modules)
	Frequency (AC, Hz)	50/60
Heat dissipation	Heat dissipation mode	Air cooling
	Number of fans	6
	Heat dissipation airflow	Port-side air intake

Environment specifications	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
	Storage relative humidity (RH)	5% to 95%
	Operating altitude (m)	Up to 5000
	Noise at normal temperature	Back-to-front airflow:
	(27°C, sound pressure) (dBA)	63.5 dB(A) on average (maximum: 70.7 dB(A))
	Noise at high temperature (40°C, sound pressure) (dBA)	Back-to-front airflow: 83.5 dB(A) on average (maximum: 90.5 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)	26.01
	MTTR (hour)	1.5
	Availability	0.9999934176

Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of CloudEngine 9000 series switches.

Certification Category	Description
Safety	EU CE: 2006/95/EC, EN 60950-1 Germany GS: EN 60950-1 CB: IEC 60950-1 USA UL: UL 60950-1 Canada CUL: CSA C22.2 No. 60950-1 Australia RCM: AS/NZS 60950-1 China CCC: GB 4943
Electromagnetic Compatibility (EMC)	EU CE: 2014/30/EU, EN55032, EN 55024, and EN 300386 US FCC: 47CFR Part 15 Canada IC: ICES-003 Australia C-Tick: AS/NZS CIPSR22 Japan VCCI: VCCI-3 and VCCI-4 China CCC: GB 9254
Environment	EU ROHS: 2002/95/EC & 2011/65/EU EU REACH: 1907/2006/EC EU WEEE: 2002/96/EC China RoHS: GB/T 26572

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

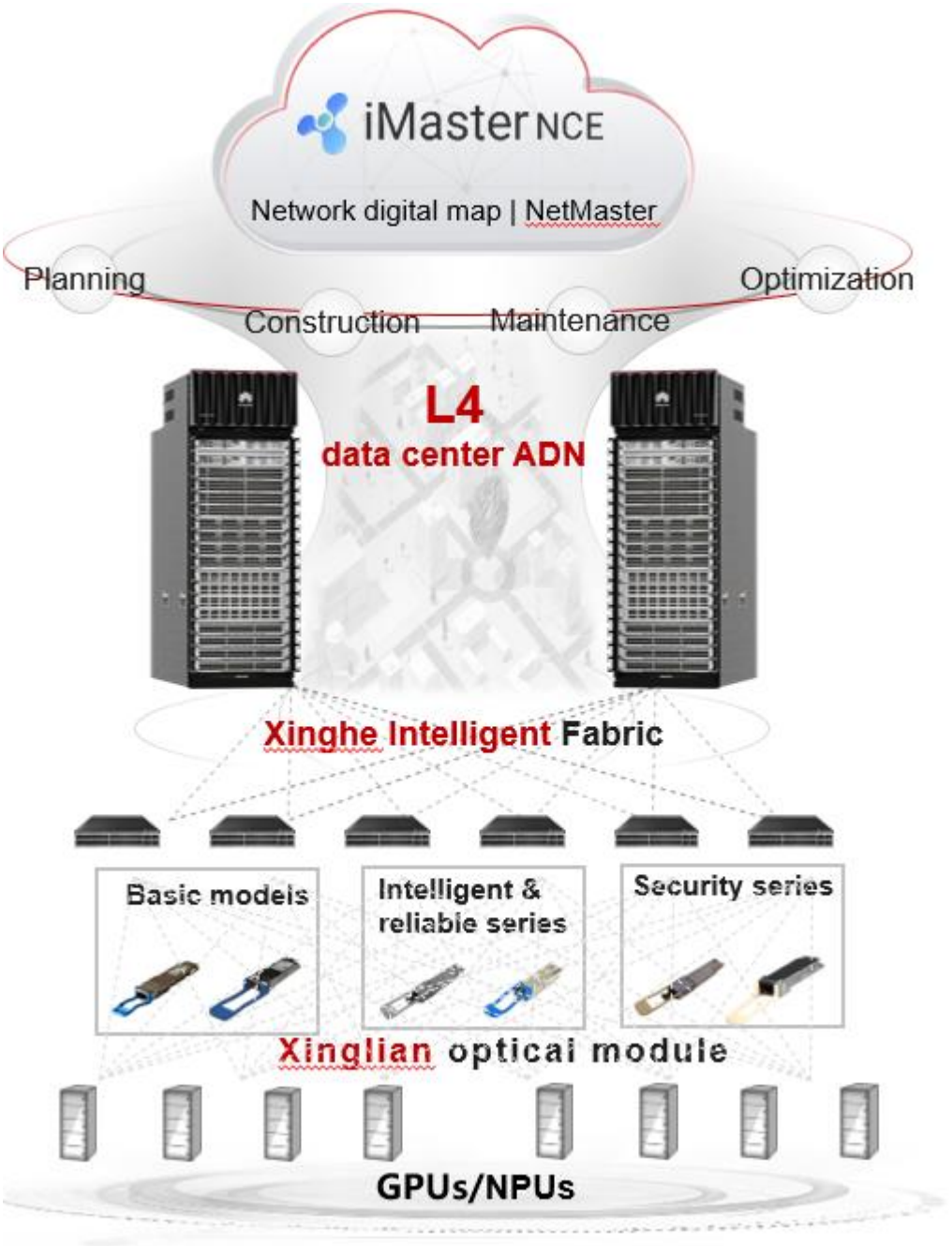
Device	Description
CE9855-32DQ	CE9855-32DQ,CE9855-32DQ switch (32*400GE QSFP-DD, without fan and power modules)
CE9855-32DQ-B	CE9855-32DQ-B,CE9855-32DQ-B switch (32*400GE QSFP-DD, 2*AC Power Modules, 6* Fans, Port-side Intake)
Fan module	
Model	**Description**
FAN-040A-A	Fan box(F,FAN panel side Intake)
Power module	
Model	**Description**
PAC2KS12-PB	2000W AC&240V DC Power Module (Back to Front,Power panel side exhaust)
PDC2K2S12-PB	2200W DC Power Module (Back to Front,Power panel side exhaust)
PHD2KS12-PB	2000W HVDC Power Module (Back to Front,Power panel side exhaust)
Software	
N1-CE98LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 9800
N1-CE98CFFD-SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine CE9800-SnS-Year
N1-CE98LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 9800
N1-CE98CFAD- SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine CE9800-SnS-Year
N1-CE98LIC-CFPM	N1-CloudFabric Premium SW License for CloudEngine 9800
N1-CE98CFPM- SnS1Y	N1-CloudFabric Premium SW License for CloudEngine 9800-SnS-Year

Device	Description
N1-CE98UPG-A-P	N1-CloudEngine 9800 Upgrade SW License:Advanced to Premium
N1-CE98UGAP- SnS1Y	N1-CloudEngine 9800 Upgrade SW License:Advanced to Premium-SnS-Year
N1-CE98LIC-AFRD	N1-CloudEngine 9800 AI Fabric RDMA Application Acceleration Function
N1-CE98AFRD-SnS1Y	N1-CloudEngine 9800 AI Fabric RDMA Application Acceleration Function-SnS-Year
N1-CE98LIC-HPC	N1-CE88LIC-HPC,N1-CloudEngine 9800 AI Fabric Value-added Package for the HPC Scenarios
N1-CE98HPC-SnS1Y	N1-CloudEngine 9800 AI Fabric Value-added Package for the HPC Scenarios-SnS-1 Year,
N1-CE98LIC-AI	N1-CloudEngine 9800 Value-added Package for the AI Scenarios
N1-CE98AI-SnS1Y	N1-CloudEngine 9800 Value-added Package for the AI Scenarios-SnS Year
CE98LIC-FINHA	N1-CE98LIC-FINHA,N1-CloudEngine 9800 high reliability of finance Function
N1-CE98FINHA-SnS1Y	N1-CE98LIC-FINHA,N1-CloudEngine 9800 high reliability of finance 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-CEMDF-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
N1-CE-LIC-AFP1KVM	N1-CloudEngine Specified Flow Analysis Value-added Package Per 1k VM
N1-CEAFP1KVM-SnS1Y	N1-CloudEngine Specified Flow Analysis Value-added Package Per 1k VM-SnS-Year
N1-CE-LIC-XFLOW20G	N1-CloudEngine xFlow Intelligent Full-flow Analysis
N1-CEXFLOW20G-SnS1Y	N1-CloudEngine xFlow Intelligent Full-flow Analysis -SnS-Year
N1-CE-LIC-XFLOW40G	N1-CloudEngine xFlow Intelligent Full-flow Analysis, 40Gbps, 15Mpps, 1.8M Flow Per Second
N1-CEXFLOW40G-SnS1Y	N1-CloudEngine xFlow Intelligent Full-flow Analysis, 40Gbps, 15Mpps, 1.8M Flow Per Second-SnS-Year

Networking and Applications

Typical Application in DCs

On a typical DCN, CloudEngine CE16808 or CE16816 switches work as core switches, whereas CloudEngine CE9800 series switches work as TOR switches and connect to the core switches through 40GE, 100GE, 200GE or 400GE ports to build an end-to-end and fully-connected 100GE/200GE/400GE network.



More Information

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

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

★ Global service hotline: http://e.huawei.com/en/service-hotline

★ Enterprise technical support website: http://support.huawei.com/enterprise/

★ Service email address for enterprise users: support_e@huawei.com

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