



Huawei CloudEngine 9860-4C-EI-A Data Center Switch Datasheet


The CloudEngine 9860-4C-EI-A series are Huawei's next-generation Ethernet switches designed for data centers (DCs). They feature high performance, high port density, low latency, and flexible cards.

Product Overview





The CloudEngine 9860-4C-EI-A series are Huawei's next-generation Ethernet switches designed for DCs. They feature high performance, high port density, low latency, and flexible cards. They are built on an advanced hardware structure and provide high-density 400GE, 100GE, and 40GE ports. Running over the Huawei VRP8 software platform, they support abundant DC features. In addition, the CloudEngine 9860-4C-EI-A series switches can work with the CloudEngine 16800/8800/6800/5800 series switches to build an elastic, virtual, and high-quality data center network (DCN), meeting networking requirements of DCs in the cloud computing era.

CloudEngine 9860-4C-EI-A series switches can function as core or aggregation switches on DCNs to help enterprises and carriers build a DCN platform for cloud computing. They can also be used as aggregation or core switches on campus networks.

Product Models and Appearances

Model	Appearance
CE9860-4C-EI-A	 <p>4 U high, supporting four full-width flexible cards</p>

Card models of the CloudEngine 9860-4C-EI-A:

Model	Appearance
CE98-D32CQ-A	 <p>32-port 100GE/40GE QSFP28 line processing unit (LPU)</p>
CE98-D8DQ	 <p>8-port 400GE QSFP-DD LPU</p>
CE98-D32CQ-F	 <p>32-port 100GE QSFP28 LPU</p>
CE98-D8DQ-F	 <p>8-port 400GE QSFP-DD LPU</p>

Key Features

Ultra-High Capacity: High-Density 400GE/100GE/40GE Aggregation

- 25.6 Tbit/s switching, 8000 Mpps forwarding, and L2/L3 full line-rate forwarding capabilities
- Up to 32 x 400GE QSFP-DD ports or 128 x 100GE QSFP28 ports, making the switches ideal for functioning as the core, aggregation, and access switches on DCNs and campus networks
- 100GE QSFP28 ports, supporting 100GE optical modules and 40GE QSFP+ optical modules

Large Buffer: Adequately Coping with Traffic Bursts

- Device-wide 65 MB buffer, effectively dealing with the incast scenario of the distributed system and minimizing the packet loss rate
- Buffer model configurable based on service needs to better adapt to different application scenarios

Network-Wide High Reliability and High Service Continuity During Network Faults

- CloudEngine 9860-4C-EI-A series switches support Multichassis Link Aggregation Group (M-LAG) technology to implement link aggregation among multiple devices, improving link reliability from the card level to the device level. Each node in an M-LAG can be upgraded independently. When a node is upgraded, other nodes in the group can still forward services, preventing service interruption.
- Leveraging the comprehensive inter-device link aggregation technology, CloudEngine 9860-4C-EI-A series switches evolve device coupling from control plane-based stacking to M-LAG and then finally to coupling-free M-LAG Lite. This achieves active-active server access and highly reliable switch upgrade.

Programmable Network Devices for Flexible Customization

- CloudEngine 9860-4C-EI-A series switches run over the VRP8 software platform, on which an Open Programmability System (OPS) module is embedded to provide control-plane programmability.
- Users or third-party developers can use open APIs to develop and deploy dedicated network management policies, implementing fast expansion of service functions, automatic service deployment, and intelligent device management. This ensures automatic operations and maintenance (O&M) and minimizes management costs.
- CloudEngine 9860-4C-EI-A series switches support Ansible, an automatic management and O&M tool. With this tool, they implement unified provisioning of physical and virtual networks.

Intelligent Lossless Network, Meeting High Performance Requirements of RoCEv2 Applications

- CloudEngine 9860-4C-EI-A series switches support the intelligent lossless (iLossless) algorithm, which can eliminate packet loss caused by traffic congestion on traditional Ethernet networks. Leveraging this algorithm, CloudEngine 9860-4C-EI-A series switches can build a network environment featuring zero packet loss, low latency, and high throughput, which is ideal for RoCEv2 traffic, thereby meeting high performance requirements of RoCEv2 applications.
- CloudEngine 9860-4C-EI-A series switches support priority-based flow control (PFC) deadlock prevention. They can identify service flows that may cause PFC deadlocks and change queue priorities to prevent PFC deadlocks.
- CloudEngine 9860-4C-EI-A series switches support Artificial Intelligence Explicit Congestion Notification (AI ECN), which intelligently adjusts the ECN thresholds of lossless queues based on the live-network traffic model, helping to ensure low latency and high throughput at zero packet loss and maximize the performance of loss-sensitive services.

Intelligent O&M Through Interworking with iMaster NCE-FabricInsight

- CloudEngine 9860-4C-EI-A series switches provide telemetry technology to collect device data in real time and send the data to iMaster NCE-FabricInsight — Huawei's analyzer for DCNs. iMaster NCE -FabricInsight then 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.
- CloudEngine 9860-4C-EI-A series switches support intelligent traffic analysis to perform in-depth analysis on a specified service flow, obtain data about high-precision performance indicators such as the packet loss rate and latency (nanosecond-level) of the service flow, and export the analysis results to iMaster NCE-FabricInsight for further display and analysis. This makes it easier for O&M personnel to monitor the network condition and quickly locate network faults.

Zero Touch Provisioning (ZTP), Implementing Automatic O&M

- CloudEngine 9860-4C-EI-A series switches support ZTP. With this feature, the switches can automatically obtain and load version files from a USB flash drive or file server, freeing network engineers from onsite configuration and deployment. The benefits include minimized labor costs and maximized deployment efficiency.
- ZTP provides built-in scripts through open APIs. DC users can use a programming language they are familiar with, such as Python, to centrally configure network devices.
- ZTP decouples the configuration time of devices from the device quantity and area distribution, which improves service provisioning efficiency.

Flexible Airflow Design, Improving Energy Efficiency

- Strict back-to-front airflow design (air intake from the port side):
 - The CloudEngine 9860-4C-EI-A series uses a strict 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 DC equipment rooms.
 - Redundant power modules and fan modules can be configured to ensure service continuity.
- Innovative energy-saving technologies:
 - The CloudEngine 9860-4C-EI-A series uses energy-saving chips and an intelligent fan speed adjustment scheme to measure system power consumption in real time. These energy-saving technologies reduce O&M costs and contribute to a greener DC.

Clear Indicators, Simplifying O&M

- Clear indicators:
 - The innovative port indicators clearly show the port status, port speed, and states of all sub-interfaces.
 - State and stack indicators on both the front and rear panels enable users to maintain the switch from either side.
 - The CloudEngine 9860-4C-EI-A series supports 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 simplifies cabling.

Licensing

CloudEngine 9860-4C-EI-A series switches support Huawei IDN One Software (N1) business model, which bundles iMaster NCE-Fabric, iMaster NCE-FabricInsight, and CloudEngine switches in typical scenarios to simplify transactions. This provides customers with more functions and value, and protects customers' software investment through Software License Portability.

Product Series	Feature	N1 Software Package (Mandatory)			N1 Add-On Package (Optional)			
		Founda tion packag e	Adva nced packa ge	Premi um package	AI Fabric function package	Multi- cloud, multi- DC scenar io packa ge	Value- added package of network traffic analysis	Digital map
CloudEngine 9860-4C-EI-A series	Base software	√	√	√				
	IPv6	√	√	√				
	Hitless upgrade	√	√	√				
	Telemetry	√	√	√				

Product Series	Feature	N1 Software Package (Mandatory)			N1 Add-On Package (Optional)			
	LLETH				√			
iMaster NCE-Fabric	Automation functions	√	√	√				
	Basic digital map functions							√
	Basic intent functions			√				
	Runbook		√	√				
	Multi-cloud and multi-DC automation scenario package					√		
iMaster NCE-FabricInsight	Telemetry and basic network analysis functions	√	√	√				
	Network health evaluation		√	√				
	Value-added functions of network traffic analysis (100 VMs)			√				
	IFIT service assurance function			√				
	Value-added functions of network traffic analysis (1000 VMs)						√	
	Multi-cloud and multi-DC analysis scenario package					√		
Mapping		Select one from the three packages. The Advanced package contains features of the Foundation package, and the Premium package contains features of the Advanced package.			Used together with the Foundation, Advanced, or Premium package.			
For details about product function differences, see the product documentation.								

Note: For details about the N1 business model, visit: <https://e.huawei.com/en/material/enterprise/f3272debb1c04015a538915657a89797>

Specifications

Item	CloudEngine 9860-4C-EI-A-4C-EI
Port description	4 slots, providing up to 128 x 100GE QSFP28 or 32 x 400GE QSFP-DD ports
Switching capacity	25.6 Tbit/s
Packet forwarding rate	8000 Mpps
Airflow design	Standard back-to-front airflow
Device virtualization	M-LAG
Network convergence	Data Center Bridging Exchange Protocol (DCBX) and PFC Remote direct memory access (RDMA) and RoCE (RoCE v1 and RoCE v2)
Programmability	OPS programming Ansible-based automatic configuration and open-source module release
Traffic analysis	NetStream sFlow
VLAN	Access, trunk, and hybrid Default VLAN GARP VLAN Registration Protocol (GVRP)
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	IPv6 neighbor discovery (ND) Path MTU Discovery (PMTU) TCP6, IPv6 ping, IPv6 tracer, IPv6 socket, UDP6, and raw IPv6
Multicast	Multicast routing protocols, such as Internet Group Multicast Protocol (IGMP), Protocol Independent Multicast-Sparse Mode (PIM-SM), and Protocol Independent Multicast-Dense Mode (PIM-DM) Fast leaving of multicast member interfaces Multicast traffic suppression
Reliability	Link Aggregation Control Protocol (LACP) STP, RSTP, VBST, and MSTP BPDU protection, root protection, and loop prevention Device Link Detection Protocol (DLDP) VRRP, VRRP load balancing, and BFD for VRRP

Item	CloudEngine 9860-4C-EI-A-4C-EI
	BFD for BGP, IS-IS, OSPF, and static routes
	Traffic classification based on Layer 2 headers, Layer 3 headers, and Layer 4 protocol priorities
	ACL, CAR, re-marking, and scheduling
QoS	Queue scheduling modes such as PQ, WRR, DRR, PQ+WRR, and PQ+DRR
	Congestion avoidance mechanisms such as WRED and tail drop
	Traffic shaping
Intelligent O&M	Network-wide path detection
	Telemetry
	INT (IOAM) enhancement
Intelligent lossless network	PFC deadlock prevention
	AI ECN
Configuration and maintenance	Terminal access services such as console port login, 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
	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, port security, and sticky MAC
	Binding of the IP address, MAC address, port number, and VLAN ID
	Authentication methods, including AAA, RADIUS, and HWTACACS
	RMON
Dimensions (H x W x D)	175 mm x 442 mm x 765 mm
Weight (full configuration)	43.2 kg (including four power modules, four fan modules, and four cards) 33.04 kg (including four power modules and four fan modules)
Environment requirements	Operating temperature: 0°C to 40°C (0 m to 1800 m) Storage temperature: -40°C to +70°C Relative humidity: 5% RH to 95% RH (noncondensing)
Rated input voltage	Rated input voltage range of a 1200 W AC&240 V DC power module: AC: 100 V AC to 240 V AC, 50/60 Hz; DC: 240 V DC 1200 W DC power module: -48C DC:-48 V DC to -60 V DC; +48 V DC: +48 V DC
Input voltage range	1200 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 1200 W DC power module: -48 V DC: -38.4 V DC to -72 V DC; +48 V DC: +38.4 V DC to +60 V

Item	CloudEngine 9860-4C-EI-A-4C-EI
	DC
Typical power consumption	<p>Configured with four CE98-D32CQ-A cards: 1291 W (100% traffic load, short-distance 100GE optical modules on 64 ports, normal temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D8DQ cards: 953 W (100% traffic load, short-distance 400GE optical modules on 16 ports, normal temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D32CQ-F cards: 1313 W (100% traffic load, short-distance 100GE optical modules on 64 ports, normal temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D8DQ-F cards: 961 W (100% traffic load, short-distance 400GE optical modules on 16 ports, normal temperature, fully configured with AC power modules)</p>
Maximum power consumption	<p>Configured with four CE98-D8DQ cards: 1261 W (100% traffic load, short-distance 400GE optical modules on 32 ports, normal temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D32CQ-A cards: 2253 W (100% traffic load, long-distance 100GE optical modules on 128 ports, high temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D8DQ cards: 1677 W (100% traffic load, long-distance 400GE optical modules on 32 ports, high temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D32CQ-F cards: 1838 W (100% traffic load, short-distance 100GE optical modules on 128 ports, high temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D8DQ-F cards: 1321 W (100% traffic load, short-distance 400GE optical modules on 32 ports, high temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D32CQ-F cards: 2263 W (100% traffic load, long-distance 100GE optical modules on 128 ports, high temperature, fully configured with AC power modules)</p> <p>Configured with four CE98-D8DQ-F cards: 1737 W (100% traffic load, long-distance 400GE optical modules on 32 ports, high temperature, fully configured with AC power modules)</p>

Ordering Information

Active Device		
CE9860-4C-EI-A-B	CE9860-4C-EI-A mainframe (4*subcard slots, 4*AC power modules, port-side intake)	
CE9860-4C-EI-A-B1	CE9860-4C-EI-A mainframe (4*subcard slots, 4*AC power modules, 4*fan modules, 4*32 Port 100GE QSFP28 Interface card,port-side intake)	
CE9860-4C-EI-A	CE9860-4C-EI-A mainframe (4*subcard slots, without fan and power modules)	
Subcard		
CE98-D32CQ-A	CE98: 32-port 100GE QSFP28 LPU	
CE98-D8DQ	CE98: 8-port 400GE QSFP-DD LPU	
CE98-D32CQ-F	CE98: 32-port 100GE QSFP28 Interface Card-1*1	
CE98-D8DQ-F	CE98: 8-port 400GE QSFP-DD Interface Card-1*1	
Power module		
Model	Description	Applicable product
PAC1K2S12-PB	1200W AC&240V DC Power Module (Back to Front,Power panel side exhaust)	CE9860-4C-EI-A
PDC1K2S12-CE	1200W DC Power Module (Back to Front,Power panel side exhaust)	CE9860-4C-EI-A
Fan module		

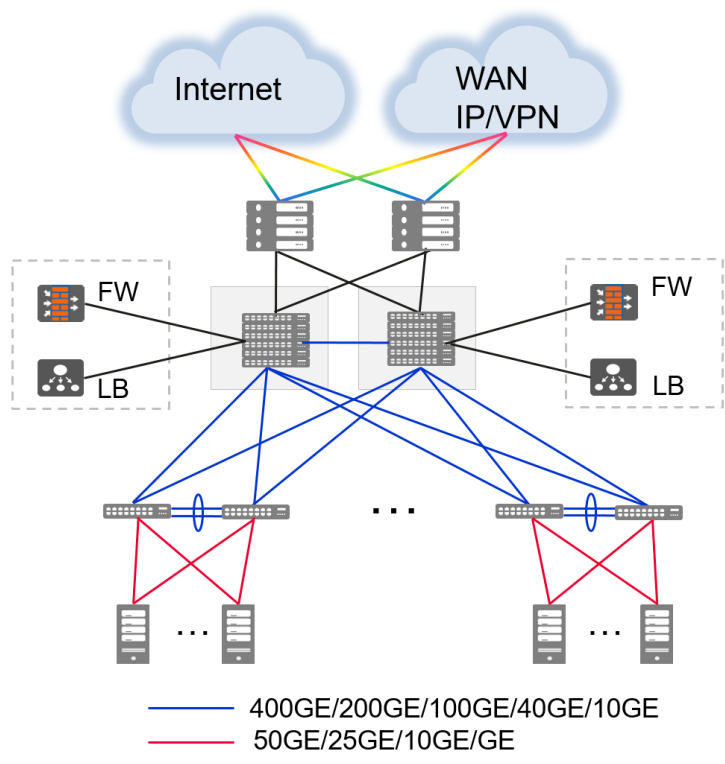
Active Device		
Model	Description	Applicable product
FAN-180C-B	Fan box(B,FAN panel side exhaust)	CE9860-4C-EI-A
Software		
N1-CE98LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 9800	
N1-CE98CFFD- SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine 9800-SnS-Year	
N1-CE98LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 9800	
N1-CE98CFAD-SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine 9800-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	
N1-CE98LIC-AIF	N1-CloudEngine 9800 AI Fabric Function	
N1-CE98AIF-SnS1Y	N1-CloudEngine 9800 AI Fabric Function-SnS-Year	
N1-CE-F-LIC-DM	N1-CloudEngine Digital Map Function-Fixed	
N1-CEFDM-SnS1Y	N1-CloudEngine Digital Map Function, Per Fixed device-SnS-Year	
N1-CE-LIC-AFP1KVM	N1-CloudEngine Network Intelligent Analysis Flow Advantage Per 1000 VM,Electronic	
N1-CEAFP1KVM-SnS1Y	N1-CloudEngine Network Intelligent Analysis Flow Advantage Per 1000 VM-SnS-Year,Electronic	
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	

Application in a DC

In a typical DC, the CloudEngine 16800, CloudEngine 9800, and CloudEngine 8800 series can function as core switches and can interconnect with the CloudEngine 6800 and CloudEngine 5800 series that function as ToR switches through 100GE, 40GE, or 10GE ports.

CloudEngine 16800
 CloudEngine 12800
 CloudEngine 9800
 CloudEngine 8800

 CloudEngine 8800
 CloudEngine 6800
 CloudEngine 5800



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