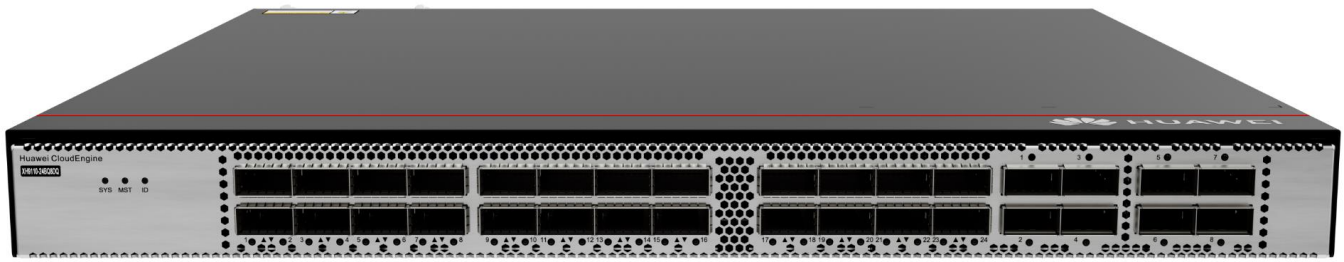
Huawei CloudEngine XH9110-24BQ8DQ Data Center Switch Datasheet

Huawei CloudEngine XH9110 series switches are next-generation high-density 200GE access switches in data center (DC) AI scenarios. This series supports 400GE uplink ports.



Product Overview

Huawei CloudEngine XH9110 series switches are next-generation high-performance and high-density 200GE access switches in DC AI scenarios. They have an advanced hardware architecture, offer high-density 200GE access ports, and support a wide range of DC service features as well as a flexible airflow direction (front-to-back or back-to-front). CloudEngine XH9110 series switches can work with CloudEngine XH16800 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 XH9110 series switches provide high-density 200GE access to help enterprises and carriers build DCNs in the AI era.

Product Models and Appearances

CloudEngine XH9110 series switches contain the following model:

CloudEngine XH9110-24BQ8DQ

Product Appearance	Description
 Port side  Fan module and power module side	• Downlink: 24 x 200GE QSFP56 (200GE ports can work at the rate of 100 Gbit/s or 40 Gbit/s) • Uplink: 8 x 400GE QSFP-DD (400GE ports can work at the rate of 200 Gbit/s, 100 Gbit/s, or 40 Gbit/s)

Product Features

High-Density Access, Providing Superior Capacity

- A CloudEngine XH9110 series switch supports a maximum of 24 200GE QSFP56 ports, ensuring high-density 40GE/100GE/200GE server access and smooth evolution. A 100GE port can be split into four 25GE SFP28 ports or four 10GE SFP+ ports. The split ports support IEEE 1588v2 (PTP). The switch supports up to 96 25GE SFP28 ports or 96 10GE SFP+ ports.
- A CloudEngine XH9110 series switch supports a maximum of eight 400GE high-performance QSFP-DD ports. Each 400GE QSFP-DD port can automatically adjust its rate to 200 Gbit/s, 100 Gbit/s, or 40GE, and can be split into four 100GE QSFP28 ports or two 200GE QSFP56 ports. The split ports support IEEE 1588v2 (PTP) and provide flexibility in networking. The CloudEngine XH9110 switch can connect to the CloudEngine XH16800 series switches through 40GE/100GE/200GE uplinks to build a non-blocking network platform.

Inter-Device Link Aggregation, Ensuring High Efficiency and Reliability

- CloudEngine XH9110 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 XH9110 series switches can work with the industry's mainstream virtualization platforms. When functioning as high-performance hardware gateways on an overlay network (VXLAN), CloudEngine XH9110 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 XH9110 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 XH9110 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 Ports, Enabling Open Interconnection

- CloudEngine XH9110 series switches support NETCONF and can interconnect with iMaster NCE-Fabric.
- CloudEngine XH9110 series switches support Ansible — an automatic management and O&M tool — to implement unified provisioning of physical and virtual networks.
- CloudEngine XH9110 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 (ZTP), Enabling Automatic O&M

- CloudEngine XH9110 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 XH9110 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 XH9110 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 XH9110 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 XH9110 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 XH9110 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 XH9110 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 XH9110 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 XH9110 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.
- CloudEngine XH9110 series switches support Explicit Congestion Notification (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.

Strict Front-to-Back Airflow Design, Achieving High Energy Efficiency

Flexible front-to-back or back-to-front airflow design:

- CloudEngine XH9110 series switches use a strict front-to-back 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 back or from back 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 XH9110 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-ports.
- State indicators on both the front and rear panels enable users to maintain the switch from either side.
- CloudEngine XH9110 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.

Licensing

Huawei CloudEngine XH9110 series switches support the CloudFabric IDN One Software (N1) business model, which bundles iMaster NCE-Fabric, iMaster NCE-FabricInsight, and 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 Package for AI Scenarios	Add-On Package	
	Advanced	Digital Map	Security
Basic functions (including IPv6 and VXLAN)	•		
AI ECN	•		
FusionInsight basic analysis	•		
Telemetry	•		
AI ZTP	•		
NSLB	•		
IFIT function	•		
IFIT service assurance function	•		
MACsec			•
Digital map function		•	

Product Specifications

Item	CloudEngine XH9110-24BQ8DQ
Device virtualization	M-LAG
Port	Jumbo frames
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 leaving of multicast member interfaces
	Multicast traffic suppression
	Multicast NAT
Reliability	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 3.3 ms
	VRRP, VRRP load sharing, 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

Item	CloudEngine XH9110-24BQ8DQ
	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 (PTP)
Intelligent O&M	Network-wide path detection
	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
	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 patching
	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 ACLs	34K@160 bits (inbound) + 2K@320 bits (outbound) (K = 1024)
Maximum number of VXLAN bridge domains	16K
Maximum number of BDIF interfaces	16K
Maximum number of virtual tunnel endpoints (VTEPs)	16K
Maximum number of LAGs	1024
Maximum number of links in a LAG	256
Maximum number of MSTIs	1000
Maximum number of VLANs where VBST can be configured	640K

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

Hardware Specifications

Item		CloudEngine XH9110-24BQ8DQ
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)]	9.16
	Switching capacity (Tbps)	16
	Forwarding performance (Mpps)	2400
200GE QSFP56 port		24
400GE QSFP-DD port		8
Management interface	Console port	1 x RJ45 interface
	USB port	1
CPU	Number of cores	4
Buffer	System Buffer	65 MB

Item		CloudEngine XH9110-24BQ8DQ
Power supply	Power modules	1200 W AC&240 V DC power module 1200 W DC power module
	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: 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: –38.4 V DC to –72 V DC; +38.4 V DC to +57 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	291 W (100% traffic load, copper cables on 12 x 200GE + 4 x 400GE ports, normal temperature, dual AC power modules) 382 W (100% traffic load, short-distance optical modules on 12 x 200GE + 4 x 400GE ports, normal temperature, dual AC power modules)
	Maximum power	522 W (100% traffic load, short-distance optical modules on 24 x 200GE + 8 x 400GE ports, normal temperature, dual AC power modules) 770 W (100% traffic load, long-distance optical modules on 24 x 200GE + 8 x 400GE ports, high temperature, dual AC power modules)
	Frequency (AC, Hz)	50/60
Heat dissipation	Heat dissipation mode	Air cooling
	Number of fans	5
	Heat dissipation airflow	Front-to-back or back-to-front airflow
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 (27°C, sound pressure) (dBA)	Front-to-back airflow: 50.9 dB(A) on average; maximum: 53.8 dB(A) Back-to-front airflow: 50.8 dB(A) on average; maximum: 54.6 dB(A)
	Noise at high temperature (40°C, sound pressure) (dBA)	Front-to-back airflow: 76.2 dB(A) on average; maximum: 79 dB(A) Back-to-front airflow: 73.1 dB(A) on average; maximum: 79.2 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

Item		CloudEngine XH9110-24BQ8DQ
Reliability	MTBF (year)	34.22
	MTTR (hour)	1.5
	Availability	0.999994996

Safety and Regulatory Compliance

The following table lists the safety and regulatory compliance of CloudEngine 6800 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
XH9110-24BQ8DQ	XH9110-24BQ8DQ-XH9110-24BQ8DQ switch (24*200GE QSFP56, 8*400GE QSFP-DD, Without Fan and Power Modules)
XH9110-24BQ8DQ-B	XH9110-24BQ8DQ-B-XH9110-24BQ8DQ-B switch (24*200GE QSFP56, 8*400GE QSFP-DD, 2*AC Power Modules, 5*Fans, Port-side Intake)
XH9110-24BQ8DQ-F	XH9110-24BQ8DQ-F-XH9110-24BQ8DQ-F switch (24*200GE QSFP56, 8*400GE QSFP-DD, 2*AC Power Modules, 5*Fans, Port-side Exhaust)
Fan module	
Model	**Description**
FAN-040B-B	Fan box (B,FAN panel side exhaust), supporting the electronic label function
FAN-040B-F	Fan box (F,FAN panel side intake), supporting the electronic label function
Power module	
Model	**Description**
PAC1K2S12-PF	1200W AC&240V DC Power Module (Front to Back, Power panel side intake)
PAC1K2S12-PB	1200W AC&240V DC Power Module (Back to Front,Power panel side exhaust)
PDC1K2S12-PB	1200W DC Power Module (Front to Back, Power panel side intake)
PDC1K2S12-CE	1200W DC Power Module (Back to Front, Power panel side exhaust)
Software	
N1-XH-F-LIC-DM	Software Charge,N1-XH-F-LIC-DM,N1-XH Digital Map Function-Fixed
N1-XHFDM-SnS1Y	Software annual fee,N1-XHFDM-SnS1Y,N1-XH Digital Map Function, Per Fixed device-SnS-Year
N1-XH-F-LIC-MACSEC	Software Charge,N1-XH-F-LIC-MACSEC,N1-XH Data Center Switch Security Function-Fixed
N1-XHFMACSEC-SnS1Y	Software annual fee,N1-XHFMACSEC-SnS1Y,N1-XH Data Center Switch Security Function
N1-XH9KL1-LIC-ENH	Software Charge,N1-XH9KL1-LIC-ENH,N1-XH9KL1 Switch Enhanced Package for the AI Scenarios
N1-XH9KL1ENH-SnS1Y	Software annual fee,N1-XH9KL1ENH-SnS1Y,N1-XH9KL1 Switch Enhanced Package for the AI Scenarios-SnS-1 Year

Networking and Applications

Typical Application in DCs

On a typical DCN, CloudEngine XH16800-8 or XH16800-16 switches work as core switches, whereas CloudEngine XH9110 series switches work as TOR switches and connect to the core switches through 40GE, 100GE, or 200GE ports to build an end-to-end and fully-connected 100GE/200GE/400GE network. The switches use VXLAN and other fabric protocols to establish a non-blocking large Layer 2 network, which allows large-scale VM migration and flexible service deployment.


iMaster NCE
CloudEngine XH16800
CloudEngine XH9000
CloudEngine XH8000

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

Copyright © Huawei Technologies Co., Ltd. 2024. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Technologies Co., Ltd.

Trademarks and Permissions

HUAWEI and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.

All other trademarks and trade names mentioned in this document are the property of their respective holders.

Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base, Bantian, Longgang, Shenzhen, People's Republic of China

Post code: 518129

Website: e.huawei.com