Huawei CloudEngine 6860-HAM Data Center Switch Datasheet

Huawei CloudEngine 6860-HAM series switches are next-generation high-density 10GE/25GE/50GE access switches with 40GE/100GE/200GE uplink ports, which are ideal for high-reliability multicast scenarios in data centers.

CloudEngine 6860-HAM series switches are designed for high-reliability multicast networking in data centers, helping enterprises and carriers build a stable and large-scale network platform.

Product Overview

Huawei CloudEngine 6860-HAM series switches are next-generation 10GE/25GE/50GE access switches featuring powerful performance, high reliability, low latency, and easy O&M. They are designed for high-reliability multicast scenarios in data centers. They adopt an advanced hardware structure and provide high-density 10GE/25GE/50GE downlink ports and 40GE/100GE/200GE uplink ports. Their airflow direction can be flexibly changed to suit layout in your equipment room. The switches also support up to 32K multicast groups and ultra-fast convergence upon a single point of failure, without interrupting production services. In addition, they can meet the requirements of three-generation bandwidth evolution and flexible server access, meeting the requirements of capacity expansion in the next 10 years.

CloudEngine 6860-HAM series can be used with CloudEngine 16800 (Huawei's data center core switches) or CloudEngine 8850-HAM to build an intelligent and lossless data center network solution, meeting the requirements of stable and large-scale networking scenarios.

Product Appearance

CloudEngine 6860-HAM series switches provide forty-eight 25GE SFP28 ports or forty-eight 50GE SFP56 ports, and eight 100GE QSFP28 or 200GE QSFP56 ports. The following figure shows the product appearance.

Product Characteristics

High-Density Access, Superior Capacity

- The switch can provide up to forty-eight 10GE/25GE/50GE ports, meeting the high-density access requirements of 10GE/25GE/50GE servers and supporting smooth evolution.

- The switch provides up to eight 100GE high-performance QSFP28 ports or eight 200GE high-performance QSFP56 ports. In addition, a 200GE QSFP56 port can work as a 40GE/100GE port through auto-sensing. A 100GE QSFP28 port can be used as a 40GE QSFP+ port, or split into four 25GE SFP28 or 10GE SFP+ ports to provide flexible networking capabilities. The switch can connect to CloudEngine 16800 or CloudEngine 8850-HAM series switches through 40GE/100GE/200GE uplink ports to set up a non-blocking network platform.

Inter-Device Link Aggregation, High Efficiency and Reliability

- CloudEngine 6860-HAM switches support multi-chassis link aggregation group (M-LAG), which enables inter-device link aggregation, ensuring device-level reliability.

- 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 can be upgraded independently. During the upgrade, other switches in the system take over traffic forwarding, ensuring uninterrupted services.

- M-LAG supports dual-homing to Ethernet, VXLAN, and IP networks, allowing for flexible networking.

Virtualized Hardware Gateway, Enabling Quick Deployment

- CloudEngine 6860-HAM switches can work with mainstream virtualization platforms. As the high-performance hardware gateway of an overlay network (VXLAN), a CloudEngine series switch can support 16 million tenants.

- CloudEngine 6860-HAM switches can connect to a cloud platform through open APIs, facilitating unified management of virtual and physical networks.

- The hardware gateway deployment enables fast service deployment without changing the customer network, protecting customer investment.
- CloudEngine 6860-HAM switches support Border Gateway Protocol Ethernet VPN (BGP EVPN), which can run as the VXLAN control plane to simplify VXLAN configuration within and between data centers.

Standard Interfaces, Enabling Openness and Interoperability

- CloudEngine 6860-HAM series support NETCONF and can interwork with Huawei's iMaster NCE-Fabric.
- CloudEngine 6860-HAM series switches support the Ansible automatic management and O&M tool to implement unified provisioning of physical and virtual networks.
- CloudEngine 6860-HAM series switches support in-depth integration with mainstream cloud platforms (including commercial cloud platforms and open-source cloud platforms) and third-party controllers to support flexible network customization and automatic management.

ZTP, Implementing Automatic O&M

- CloudEngine 6860-HAM switches support Zero Touch Provisioning (ZTP). ZTP enables CloudEngine 6860-HAM 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 provides built-in scripts through open APIs. Data center personnel can use a programming language they are familiar with, such as Python, to centrally configure network devices.
- ZTP decouples the configuration time of new devices from the device quantity and area distribution, which improves service provisioning efficiency.

Intelligent O&M Through Cooperation with iMaster NCE-FabricInsight

- Telemetry: CloudEngine 6860-HAM switches collect device data in real time and send the data to iMaster NCE-FabricInsight, which is a DCN analysis component of Huawei iMaster NCE. iMaster NCE-FabricInsight uses an intelligent fault identification algorithm to analyze network data and accurately display the network status in real time. In addition, iMaster NCE-FabricInsight can effectively demarcate faults and locate fault causes in a timely manner to identify network issues that deteriorate user experience, guaranteeing superb user experience.
- AnyFlow: CloudEngine 6860-HAM switches create flow entries for TCP, UDP, and VXLAN traffic entering the switches based on fields such as 5-tuple, in order to collect traffic statistics and detect abnormal traffic. They also report those flow entries to iMaster NCE-FabricInsight for network quality analysis.
- Intelligent traffic analysis: CloudEngine 6860-HAM switches perform in-depth analysis on a specified service flow to obtain data about high-precision performance indicators such as the packet loss rate and latency (nanosecond-level) of the service flow. They then send the analysis result to iMaster NCE-FabricInsight for graphical display. This makes it easier for O&M personnel to monitor the network running status and quickly locate network faults.
- Packet event: Related flow entries are reported to iMaster NCE-FabricInsight if CloudEngine 6860-HAM switches discard packets due to reasons such as abnormal forwarding, specified packet discarding rules, a full buffer, or deny action in ACL rules, or if the latency of packets exceeds a specified threshold.

Simplified Network Deployment Through Cooperation with iMaster NCE-Fabric

- CloudEngine 6860-HAM switches can interconnect with iMaster NCE-Fabric through standard protocols such as NETCONF and SNMP to implement automated network management, providing more efficient and intelligent operation methods, simplifying network management, and reducing the OPEX.

Intelligent and Lossless Networking, Meeting High Performance Requirements of RoCEv2 Applications

- CloudEngine 6860-HAM switches support iLossless algorithm, which prevents packet loss caused by traffic congestion on traditional Ethernet and helps build a network environment featuring zero packet loss, low latency, and high throughput for RoCEv2 traffic. This meets high performance requirements of RoCEv2 applications.
- CloudEngine 6860-HAM switches support PFC deadlock prevention, which identifies service flows that easily cause PFC deadlocks and changes queue priorities to prevent PFC deadlocks.
- CloudEngine 6860-HAM switches support Artificial Intelligence Explicit Congestion Notification (AI ECN), which intelligently adjusts ECN thresholds of lossless queues based on the live-network traffic model. This ensures low delay, high throughput, and zero packet loss, delivering optimal performance for lossless services.

- CloudEngine 6860-HAM switches support Explicit Congestion Notification (ECN) overlay, which applies ECN to a VXLAN network to enable the traffic receiver to detect traffic congestion on the overlay network in a timely manner and instruct the traffic transmitter to reduce its packet transmission speed, thereby relieving network congestion.
- CloudEngine 6860-HAM switches support intelligent Quantized Congestion Notification (iQCN), which intelligently identifies network congestion. iQCN enables the switch to proactively transmit CNPs to the transmitter based on the interval at which the receiver sends CNPs and the interval between speed increase events of the NIC of the transmitter. In this way, the sender can receive CNPs in a timely manner and will not increase its packet transmission speed, preventing congestion from being exacerbated.

Flexible Airflow Design, Improving Energy Efficiency

- Flexible front-to-back or back-to-front airflow design:
  - CloudEngine 6860-HAM switches use a strict front-to-back or back-to-front airflow design, which isolates cold air channels from hot air channels. This design improves heat dissipation efficiency and meets design requirements of 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:
  - CloudEngine 6860-HAM switches have innovative energy-saving chips and can measure system power consumption in real time. The 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 100GE port indicators can show the states of all ports derived from the 100GE ports.
  - Both the front and rear panels can show the system status through indicators, facilitating switch maintenance from either side.
  - CloudEngine 6860-HAM switches support remote positioning. Remote positioning indicators enable you to easily identify the switches to be maintained in an equipment room full of devices.
- Simple maintenance:
  - The management port, fans, and power modules are on the front panel, which facilitates maintenance.
  - Data ports are located at the rear, facing servers. This simplifies cabling.

Licensing

CloudEngine 6860-HAM switches support Huawei IDN One Software (N1 mode for short) licensing mode. The CloudFabric N1 business model combines the iMaster 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.

Feature	N1 Software Package (Mandatory)			N1 Add-On Package (Optional)						
	Foundation	Advanced	Premium	TCP Acceleration Value-added Package	RDMA	Security Function Package	Multi-Cloud and Multi DC-Scenario Package	Value-added Package of Network Traffic Analysis	Financial-class high reliability	Digital Map
Basic functions (including IPv6 and VXLAN)	●	●	●							
Telemetry	●	●	●							
PTP	●	●	●							
M-LAG virtual peer-link	●	●	●							

Item										
Macsec						●				
AI ECN2.0					●					
TCP optimization				●	●					
IFIT										
Financial-class high reliability									●	
MoFRR									●	
Automation	●	●	●							
Basic intent functions			●							
Runbook		●	●							
Multi-cloud and multi-DC automation scenario package							●			
Basic digital map functions										●
Basic network analysis functions	●	●	●							
Network health evaluation		●	●							
Value-added functions of network traffic analysis (100 VMs)			●							
Value-added functions of network traffic analysis (1000 VMs)								●		
Value-added package of multi-cloud and multi-DC analysis scenarios							●			
Configuration	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. Used together with the Foundation, Advanced, or Premium package.					

Note: For detailed information of Huawei CloudFabric N1 business model, visit
https://e.huawei.com/en/material/networking/dcswitch/03a0e69bfa2c4f168323ba94a75f1f09.

Product Specifications

Item	CloudEngine 6860-HAM
10/25GE SFP28 ports	48
50GE SFP56 ports[1]	48
40/100GE QSFP28 ports	8

Item	CloudEngine 6860-HAM
200GE QSFP56 ports[2]	8
Switching capacity (Tbps)	8 Tbit/s
Forwarding performance (Mpps)	2175 mpps
Airflow direction	Front-to-back or back-to-front
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	Adding access, trunk, and hybrid interfaces to VLANs
	Default VLAN
MAC address	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	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
	IGMP proxy
	Fast leaving of multicast member interfaces, and supports MoFRR
	Multicast traffic suppression
Reliability	Link Aggregation Control Protocol (LACP)
	STP, RSTP, VBST, and MSTP
	BPDU protection

Item	CloudEngine 6860-HAM
	Hardware-based Bidirectional Forwarding Detection (BFD), with a minimum packet sending interval of 3.3 ms
	VRRP, VRRP load balancing, and BFD for VRRP
	BFD for BGP/IS-IS/OSPF/static route
	BFD for VXLAN
QoS	Traffic classification based on Layer 2, Layer 3, Layer 4, and priority information
	ACL, CAR, re-marking, and scheduling
	Queue scheduling modes such as PQ, DRR, and PQ+DRR
	Congestion avoidance mechanisms, including WRED and tail drop
	Traffic shaping
Intelligent O&M	IEEE 1588 v2
	Network-wide path detection
	Telemetry
	ERSPAN+
	IOAM
	AnyFlow
	Intelligent traffic analysis
	Packet event: packet loss visualization and latency visualization
	Statistics on the buffer microburst status
	VXLAN OAM: VXLAN ping and VXLAN tracert
Intelligent and lossless network	PFC deadlock prevention
	iNOF
	AI ECN
	ECN overlay
	Network-based Proactive Congestion Control (NPCC)
	Intelligent Quantized Congestion Notification (iQCN)
Configuration and maintenance	Console, Telnet, and SSH terminals
	Network management protocols, such as SNMPv1/v2/v3
	File upload and download through FTP and TFTP
	BootROM upgrade and remote upgrade
	Hot patches
	User operation logs
	Configuration rollback
	Zero Touch Provisioning (ZTP)
Security and management	MACsec

Item	CloudEngine 6860-HAM
	Command line authority control based on user levels, preventing unauthorized users from using commands
	Defense against DoS 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)
Dimensions (W x D x H)	442 mm x 420 mm x 43.6 mm (17.4 in. x 16.54 in. x 1.72 in.)
Weight (full configuration)	8.7 kg (19.18 lb.)
Environment specifications	Long-term operating temperature (°C): 0°C to 40°C (0-1800 m) Storage temperature (°C): –40°C to +70°C Relative humidity: 5% RH to 95% RH, non-condensing
Operating voltage	AC: 90 V to 290 V DC: –38.4 V to –72 V 240 V HVDC: 190 V to 290 V 380 V HVDC: 190 V to 400 V
Maximum power consumption	48 x 50GE + 8 x 200GE: 619 W (100% traffic load, all downlink ports with 2 W 50GE optical modules, all uplink ports with 6.5 W 200GE optical modules, 40°C, dual power modules) 48 x 25GE + 8 x 100GE: 544 W (100% traffic load, all downlink ports with 1.5 W 25GE optical modules, all uplink ports with 5 W 100GE optical modules, 40°C, dual power modules)

1: The switch provides a minimum of twenty-four 10GE/25GE ports. With a CE68-RTU-24XS hardware RTU license loaded, the switch can provide up to forty-eight 10GE/25GE ports.

2: With CE68-RTU-U24S and CE68-RTU-U8CQ hardware RTU licenses loaded, the switch can provide forty-eight 50GE ports and eight 200GE ports.

Ordering Information

Mainframe	
CE6860-HAM	CE6860-HAM switch (48*25GE SFP28, 8*100GE QSFP28, without fan and power modules)(CM)
CE6860-HAM-B	CE6860-HAM switch (48*25GE SFP28, 8*100GE QSFP28, 2*AC power modules, 4*fan modules, port-side intake(CM)
CE6860-HAM-F	CE6860-HAM switch (48*25GE SFP28, 8*100GE QSFP28, 2*AC power modules, 4*fan modules, port-side exhaust)(CM)

Fan Tray

Model	Description	Applicable Product
FAN-031A-F	Fan box (F,FAN panel side intake)	CE6860-HAM
FAN-031A-B	Fan box (B,FAN panel side exhaust)	CE6860-HAM

Power

Model	Description	Applicable Product
PAC600S12-CF	600W AC Power Module(Front to Back,Power panel side intake)	CE6860-HAM
PAC600S12-CB	600W AC Power Module(Back to Front, Power panel side exhaust)	CE6860-HAM
PDC1000S12-DF	1000W DC Power Module (Front to Back,Power panel side intake)	CE6860-HAM
PDC1000S12-DB	1000W DC Power Module (Back to Front,Power panel side exhaust)	CE6860-HAM
PHD1K2S12-DB	1200W HVDC Power Module (Back to Front, Power panel side exhaust)	CE6860-HAM

Hardware RTU	
CE68-RTU-24XS	24*25GE Port Right-to-Use for CloudEngine 6800
CE68-RTU-U24S	24*25GE Upgrade to 24*50GE Right-to-Use for CloudEngine 6800
CE68-RTU-U8CQ	8*100GE Upgrade to 8*200GE Right-to-Use for CloudEngine 6800

Software	
N1-CE68LIC-CFFD	N1-CloudFabric Foundation SW License for CloudEngine 6800
N1-CE68CFFD-SnS1Y	N1-CloudFabric Foundation SW License for CloudEngine 6800-SnS-1 Year
N1-CE68LIC-CFAD	N1-CloudFabric Advanced SW License for CloudEngine 6800
N1-CE68CFAD-SnS1Y	N1-CloudFabric Advanced SW License for CloudEngine -SnS -1 Year
N1-CE68LIC-CFPM	N1-CloudFabric Premium SW License for CloudEngine 6800
N1-CE68CFPM-SnS1Y	N1-CloudFabric Premium SW License for CloudEngine 6800 -SnS-Year
N1-CE68LIC-SEC	N1-CloudEngine 6800 Security Function
N1-CE68SEC-SnS1Y	N1-CloudEngine 6800 Security Function-SnS-Year
N1-CE68LIC-TCPAC	N1-CloudEngine 6800 Value-added Package for the TCP Acceleration Scenarios
N1-CE68TCPAC-SnS1Y	N1-CloudEngine 6800 Value-added Package for the TCP Acceleration Scenarios-Subscription and Support-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-F-LIC-AFP1KVM	N1-CloudEngine Network Intelligent Analysis Flow Advantage Per 1000 VM
N1-CEFAFP1KVM-SnS1Y	N1-CloudEngine Network Intelligent Analysis Flow Advantage Per 1000 VM-SnS-Year
N1-CE68UPG-F-A	N1-CloudEngine 6800 Upgrade SW License:Foundation to Advanced
N1-CE68UGFA-SnS1Y	N1-CloudEngine 6800 Upgrade SW License:Foundation to Advanced-Subscription and Support-Year

Software	
N1-CE68UPG-A-P	N1-CloudEngine 6800 Upgrade SW License:Advanced to Premium
N1-CE68UGAP-SnS1Y	N1-CloudEngine 6800 Upgrade SW License:Advanced to Premium-Subscription and Support-Year

Networking and Application

Typical Applications

In a typical data center network, the CloudEngine 16800/CloudEngine 12800/CloudEngine 8800 series is used as the core switch and the CloudEngine 8800/CloudEngine 6800/CloudEngine 5800 series is used as the TOR switch. The CloudEngine 16800/CloudEngine 12800/CloudEngine 8800 series is connected through 400GE, 200GE, 100GE, 40GE, or 10GE ports. Fabric protocols such as VXLAN are used to construct a non-blocking large Layer 2 network, ensuring large-scale VM migration and flexible service deployment.
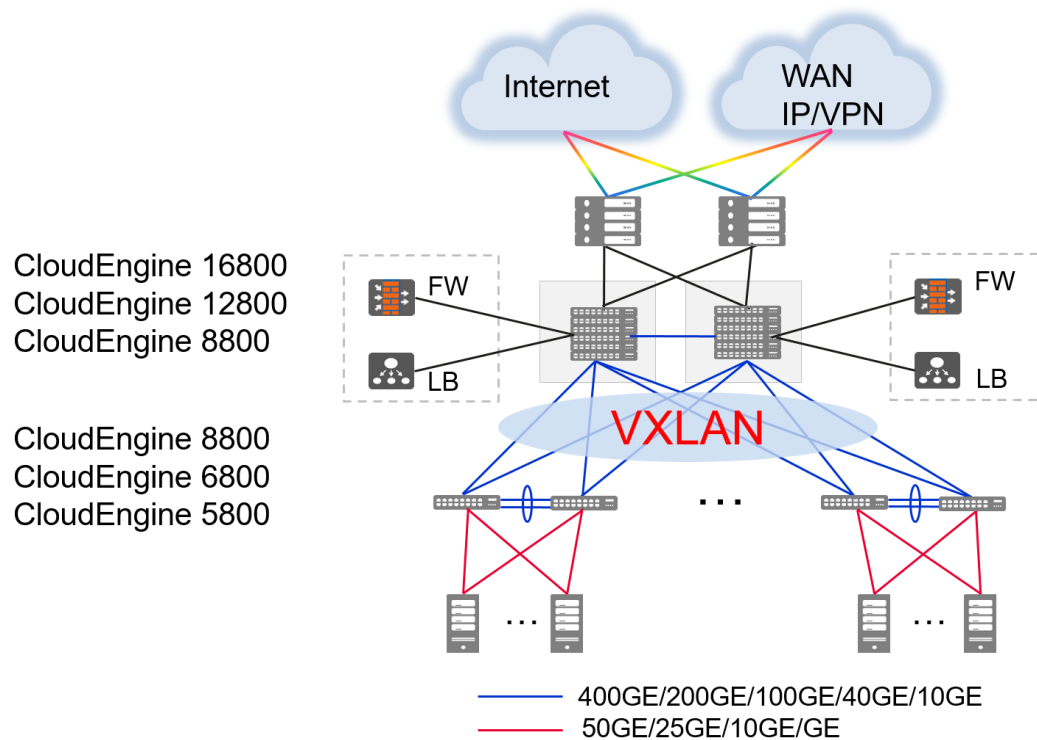
Note: VXLAN can also be used on campus networks to support flexible service deployment in different service areas.

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