

Huawei NetEngine 8000

All-Scenario Intelligent Router



HUAWEI

Product Introduction

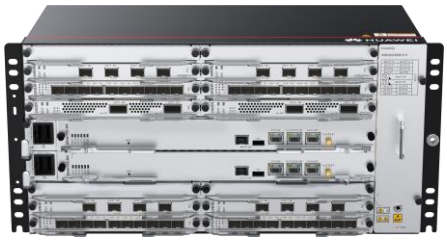
Huawei NetEngine 8000 series routers (NetEngine 8000 for short) are new-generation high-end all-scenario intelligent routers launched by Huawei. They are used in various scenarios such as access aggregation, private network, private line, IGW, DC GW, and data center interconnection. An intent-driven IP bearer network featuring simplified architecture, intelligent connection, and high availability is formed.

The NetEngine 8000 series features ultra-broadband network platform, SRv6-based intelligent connection, and full-lifecycle automation. It provides various service types and highly reliable SLAs. It is the best choice for enterprise customers in digital transformation.



Product Appearance

The NetEngine 8000 series mainly includes the NetEngine 8000 M14, M8, M6, M4, M1A, M1C, M1D, and M1D-B, which are applicable to various networking requirements.



NetEngine 8000 M14



NetEngine 8000 M8



NetEngine 8000 M6



NetEngine 8000 M4



NetEngine 8000 M1C



NetEngine 8000 M1A



NetEngine 8000 M1D



NetEngine 8000 M1D-B

Product Highlights

Features	Description
Comprehensive network slicing function	The NetEngine 8000 provides comprehensive network slicing functions to meet different SLA requirements of different services and customers, and implements services based on QoS. • Isolation and pipe statistics multiplexing; queue-based FlexE sub-interfaces implement queue-level isolation and protection; timeslot-based FlexE slicing implements physical protection for super services. • Provides high quality of service (QoS) capabilities, advanced queue scheduling algorithms, and congestion control algorithms. Supports up to 5-level HQoS scheduling mechanisms oriented to the access side, meeting service requirements of different users on the access side in a diversified and differentiated manner. It supports the network-oriented MPLS HQoS function and the QoS function deployed on the network side, implements the QoS capabilities of MPLS VPN, VLL, and PWE3 and implements multi-level precise scheduling of data flows, meeting the SLA quality requirements of different users and different service levels.

Product Highlights

Features	Description
Powerful service capabilities	The NetEngine 8000 provides rich features and powerful service processing capabilities to meet the requirements of metro networks, vertical industry networks, DCI, and campus/DC egress services. The NetEngine 8000 has the following features: • Provides powerful routing capabilities, a large-scale routing table, supports various routing protocols, such as RIP, OSPF, IS-IS, BGP4, and multicast routing protocols, plaintext and ciphertext authentication, and fast convergence, ensuring security and stability in complex routing environments. • Provides powerful service bearing capabilities. IP, MPLS, and SRv6 networks can be deployed as needed. It supports L2VPN, L3VPN, MVPN, and EVPN services; trffic engineering (TE) deployment and selective QinQ. It also provides functions such as GRE to meet traditional access requirements and emerging service requirements and meet the requirements of converged 5G services. • Provides powerful and scalable multicast capabilities and supports various IPv4/IPv6 multicast protocols, including PIM-SM/SSM, MLDv1/v2, IGMPv3, IGMP snooping, and MLD snooping. It can flexibly carry video services (for example, IPTV) meeting the requirements of various multicast services.
Comprehensive network slicing	The NetEngine 8000 provides comprehensive network slicing functions to meet SLA requirements of various services and customers, and implements services based on QoS. • Isolation and pipe statistics multiplexing; queue-based FlexE sub-interfaces implement queue-level isolation and protection; timeslot-based FlexE slicing implements physical protection for super services. • Provides high quality of service (QoS) capabilities, advanced queue scheduling algorithms, and congestion control algorithms. Supports up to 5-level HQoS scheduling mechanisms oriented to the access side, meeting service requirements of different users on the access side in a diversified and differentiated manner. It supports network-oriented MPLS HQoS and QoS deployed on the network side, implements QoS capabilities for MPLS VPN, VLL, and PWE3 and multi-level precise scheduling of data flows, meeting the SLA quality requirements of various users and service levels.
FlexE technology	• FlexE technology isolates services through interface bandwidth isolation. Interfaces can be completely isolated from one another. Traffic is isolated at the physical layer, and services are sliced on the same physical network. FlexE can be used at the access, aggregation, and core layers to meet differentiated SLA requirements for new services in the 5G and cloud era. • The NetEngine 8000 is capable of allocating network resources and provides a network-wide service quality solution to meet SLA requirements of customers with different priorities.

Product Highlights

Features	Description
Future-oriented IPv6 solution	• The NetEngine 8000 supports IPv6 routing protocols, including static routing, OSPFv3, IS-ISv6, and BGP4+. It also supports IPv6 terminal access, IPv6 ACL, IPv6 policy-based routing, and IPv6 FIB. SRv6 is supported, and smooth evolution to IPv6 can be achieved in the future. The NetEngine 8000 also supports the IPv4/IPv6 dual stack and IPv4/IPv6 transition technology, which enables communication between IPv6 and IPv4 and between IPv6 isolated islands and enhances network scalability.
High-precision time solution: IEEE 1588v2	• IEEE 1588v2 is a precision clock synchronization protocol standard for network measurement and control systems. It defines PTP for Ethernet networks. The precision can reach sub-microsecond level. IEEE 1588v2 implements frequency synchronization and time synchronization. • Time and frequency synchronization complies with the G.813 template. The 10 ns high-precision time meets the requirements of the wireless, LTE, and transportation industries. The jitter at multiple hops (less than 30 nodes) is less than 1 μs, supporting large-scale networking. The external clock source can be protected based on a specified priority. A device automatically selects the tracing source based on the priority and hop count. If the tracing source changes, the system automatically switches to the optimal source. The 200 ns-level single-NE switching ensures high clock reliability. In addition, iMaster NCE provides graphical clock management.
Comprehensive reliability solution	The NetEngine 8000 provides reliability protection at multiple levels, including device-, network-, and service-level reliability. It forms a network-wide solution and fully meets the reliability requirements of various services. 99.999% system availability is the cornerstone of reliable interconnection between enterprise services. • Device-level reliability: The NetEngine 8000 provides redundancy backup for key components. Key components support hot swap and hot backup. Technologies such as non-stop routing (NSR) and non-stop forwarding (NSF) ensure service continuity. • Network-level reliability: The NetEngine 8000 provides IP/LDP/VPN/TE FRR/hot-standby, IGP, BGP, and multicast route convergence, and Virtual Router Redundancy Protocol (VRRP). Trunk link load balancing backup, BFD fast link detection, Ethernet OAM, routing protocol/port/VLAN damping, TI-LFA, and mirror SID egress fast protection ensure the stability of the entire network and provide end-to-end protection switching within 30 ms. This frees services from being aware of a problem. • Service-level reliability: VPN FRR and E-VRRP technologies, VLL FRR and Ethernet OAM technologies, PW redundancy and E-Trunk technologies provided by the NetEngine 8000 can be used in L3VPN and L2VPN networking solutions. Ensures redundancy backup at the service layer to ensure stable, reliable, and uninterrupted services. • Dual-system hot backup: 1+1/1:1 hot backup for multicast services

Product Highlights

Features	Description
Comprehensive OAM technologies	• The NetEngine 8000 provides the point-to-point Ethernet fault management function in compliance with IEEE 802.3ah. In addition, the NetEngine 8000 supports the connection-based fault management mechanism, that is, CFM OAM, for end-to-end fault detection and location. The NetEngine 8000 provides the Ethernet performance management function in compliance with ITU-T Y.1731. By inserting timestamps into IEEE 802.1ag LB packets, the NetEngine 8000 can measure the delay, jitter, and packet loss ratio during transmission. The performance parameter measurement can be configured as a scheduled task. In addition, a report is generated together with iMaster NCE information. • iMaster NCE + In-situ Flow Information Telemetry (IFIT) technology: IFIT collects service SLA information in real time, uploads the information to iMaster NCE for intelligent analysis, control, and management, and delivers service policies. If a fault occurs, the system can quickly rectify the fault in minutes, implementing closed-loop management based on service SLAs. In addition, data is sent to the AI cloud platform for training and self-learning, so that more service types and fault models can be matched, making the "network brain" smarter, eventually enabling the WAN to move towards autonomous driving.
Green design concept	The NetEngine 8000 adopts a green design, which is more environmentally friendly and energy efficient. • Uses the industry-leading super heat dissipation system, including the mixed flow fan, carbon nano thermal pads, VC gas-liquid phase change, and floating board heat dissipation. The optimal heat dissipation design of the entire system is implemented, greatly improving heat dissipation efficiency and reducing power consumption. • The NetEngine 8000 uses Huawei-developed Solar-R chips, advanced nano-chip technology, and chip-level dynamic frequency modulation and intelligent fan speed adjustment technologies to greatly reduce power consumption, making the NetEngine 8000 more energy-saving and green.

Features	Description
Innovative technology	• The NetEngine 8000 supports the future-oriented SRv6 technology for next-generation unified networks, and builds IP backbone, metro, mobile backhaul, and data center networks. SRv6 can be used as the basic bearer protocol of the entire network to carry applications such as individual/enterprise cloud migration, inter-cloud mutual access, IoT, government and enterprise private lines, home broadband applications, and CDN. SRv6 can be used as the basic bearer protocol of the entire network to implement end-to-end full-service comprehensive bearer capabilities. SRv6 enables simplified protocols, large-scale networking, seamless integration, high reliability, integrated service chains, network and service programmability, and a full ecosystem. • The M14/M8 supports the deterministic IP (DIP) technology. DIP prevents packet collisions across periods by using the periodic scheduling mechanism, thereby ensuring the deterministic delay. • The M14/M8/M4 supports Application-aware IPv6 Networking (APN6) technology. By using the programmable space of IPv6 and SRv6, the M14/M8/M4 carries application information (identification and network performance requirements) into the network, so that the network can sense the application and requirements and provide refined network services for them. • The M14/M8/M4 supports the Data Redundancy Elimination (DRE) function, which compresses and decompresses data between WAN border routers, reducing bandwidth consumption on WAN links, saving line costs, and accelerating the deployment of distributed data centers.

Product Specifications

Property	M14	M8	M6	M4	M1A	M1C	M1D	M1D-B
Switching capacity	7.2 Tbit/s	2.4 Tbit/s	320 Gbit/s	2.4Tbit/s	352 Gbit/s	344 Gbit/s	1760 Gbps	368 Gbit/s
Forwarding performance	797 Mpps	405 Mpps	72 Mpps	405 Mpps	72 Mpps	78 Mpps	398 Mpps	72 Mpps
Number of service slots	14 service card slots	8 service card slots	6 service card slots	4 service card slots	Fixed box-shaped device			
Dimensions (H x W x D)	222 mm (5U) x 442 mm x 220 mm	132.6 mm (3U) x 442 mm x 220 mm	88.9 mm (2U) x 442 mm x 220 mm	88.4 mm (2U) x 442 mm x 220 mm	44.45 mm (1U) x 442 mm x 220 mm	44.45 mm (1U) x 442 mm x 220 mm	44.5 mm (1U) x 442 mm x 220 mm	44.5 mm (1U) x 442 mm x 220 mm
Typical power consumption	968.36 W	485.27 W	220 W	305.1 W	75 W	89.21 W	124.5 W	108.7 W
Weight in full configuration	30.0 kg (AC)	17.1 kg (AC)	11.35 kg (AC)	10.8 kg (AC)	4.5 kg (AC)	3.9 kg (AC)	4.2 kg (AC)	4.4 kg (AC)
Port type	400GE 100GE 50GE 40GE 25GE 10GE-LAN/WAN GE/FE POS /CPOS/E1	100GE 50GE 40GE 25GE 10GE-LAN/WAN GE/FE POS/CPOS/E1	50GE 25GE 10GE-LAN/WAN GE/FE POS/CPOS/E1	400GE 100GE 50GE 40GE 25GE 10GE-LAN/WAN GE/FE POS/ CPOS/E1	10GE/ GE/FE	10GE/ GE/FE	100GE 50GE 40GE 25GE 10GE GE/FE	50GE 25GE 10GE GE/FE
IPv4	Supports routing protocols, such as static routing, RIP, OSPF, IS-IS, and BGP-4. All ports forward data at the line speed in complex routing environments such as route flapping.							

Product Specifications

Property	Description
IPv6	• Various IPv4-to-IPv6 transition technologies, including manual tunnel configuration, automatic tunnel configuration, 6to4 tunnel, GRE tunnel, and ISATAP tunnel • IPv4 over IPv6 tunnels and 6PE • IPv6 static routes • Dynamic routing protocols, such as BGP4/BGP4+, RIPng, OSPFv3, and IS-ISv6 • IPv6 neighbor discovery, PMTU discovery, TCP6, ping IPv6, traceroute IPv6, socket IPv6, static IPv6 DNS, specified IPv6 DNS server, TFTP IPv6 client, and IPv6 policy-based routing • ICMPv6 MIB, UDP6 MIB, TCP6 MIB, and IPv6 MIB
MPLS	• MPLS TE, P2MP-TE/mLDP, MPLS/BGP VPN, and complies with RFC 2547 • Three cross-domain implementation modes and integration with Internet services • MPLS L2VPN based on LDP and BGP, VPLS/VLL, and heterogeneous media • Multicast VPN • MPLS-TP • EVPN • Remote LFA
SR/SRv6	• SR MPLS and SR Policy • SR TI-LFA • L3VPN over SRV6
Layer 2 features	• IEEE 802.1q, IEEE 802.1p, IEEE 802.3ad, and IEEE 802.1ab • STP, RSTP, MSTP, and VLAN • G.8032 • EVC • VXLAN

Product Specifications

Property	Description
Reliability	• IP/LDP/VPN/TE/VLL FRR, IP/TE automatic rerouting, IGP/BGP/multicast route convergence, VRRP, RRPP, and IP trunk link load balancing and backup • Hardware-based BFD for 3.3 ms fast detection, MPLS/Ethernet OAM, Y.1731, and routing protocol/port/VLAN damping • PW redundancy, E-Trunk, E-APS, and E-STP • Software hot patch technology to implement smooth software upgrade • Passive backplane design • Key components, such as the routing processing module, switch fabric, and power supply, are backed up in redundancy mode, preventing single points of failure (SPOF) on the entire system. • State-based hot backup switchover, GR, NSF, and NSR • Hot swappable for all components
QoS	• Comprehensive HQoS mechanism, each line board provides advanced scheduling and congestion avoidance technologies • Precise traffic policing and shaping functions • Complex rules and supports fine-grained flow identification • MPLS HQoS to ensure QoS scheduling for MPLS VPN, VLL, and PWE3 services • QPPB • QoS oriented to TE tunnels
Multicast	• IGMPv1, v2, and v3 • Enhanced Media Transmission Quality Indicator (EMDI) • Static multicast route, PIM-DM/SM/SSM, MSDP, MBGP, NG-MVPN, and BIERv6 • Multicast CAC • Interoperability between multiple multicast protocols • Multicast policy processing, including multicast routing protocol and multicast forwarding policy processing, multicast QoS, and multicast replication for IPoE access users • Multicast replication function for the switching fabric and line boards to achieve the optimal multicast efficiency.

Product Specifications

Property	Description
Security	• ACL packet filtering • URPF • GTSM • DHCP snooping • ARP and DoS attack defense • MAC address limit and MAC address-IP address binding • SSH and SSHv2 are supported. • NetStream
Clock	• Synchronous Ethernet • 1588v2 • Adaptive clock recovery (ACR and ATR)
Environmental requirements	• Long-term operating temperature: –20° C to +55° C • Temperature change rate: 30° C/hour • Long-term operating humidity: 5% to 85%, non-condensing • Short-term operating humidity: 5% to 95%, non-condensing • Operating altitude: ≤ 4000 m

Why Huawei Routers?

Leading in the Market and Large-Scale Commercial Use Around the World

Huawei ranks No.1 in the router market in China and No.2 in the global market.

Nearly 70% of carriers and enterprise NAs use Huawei routers.

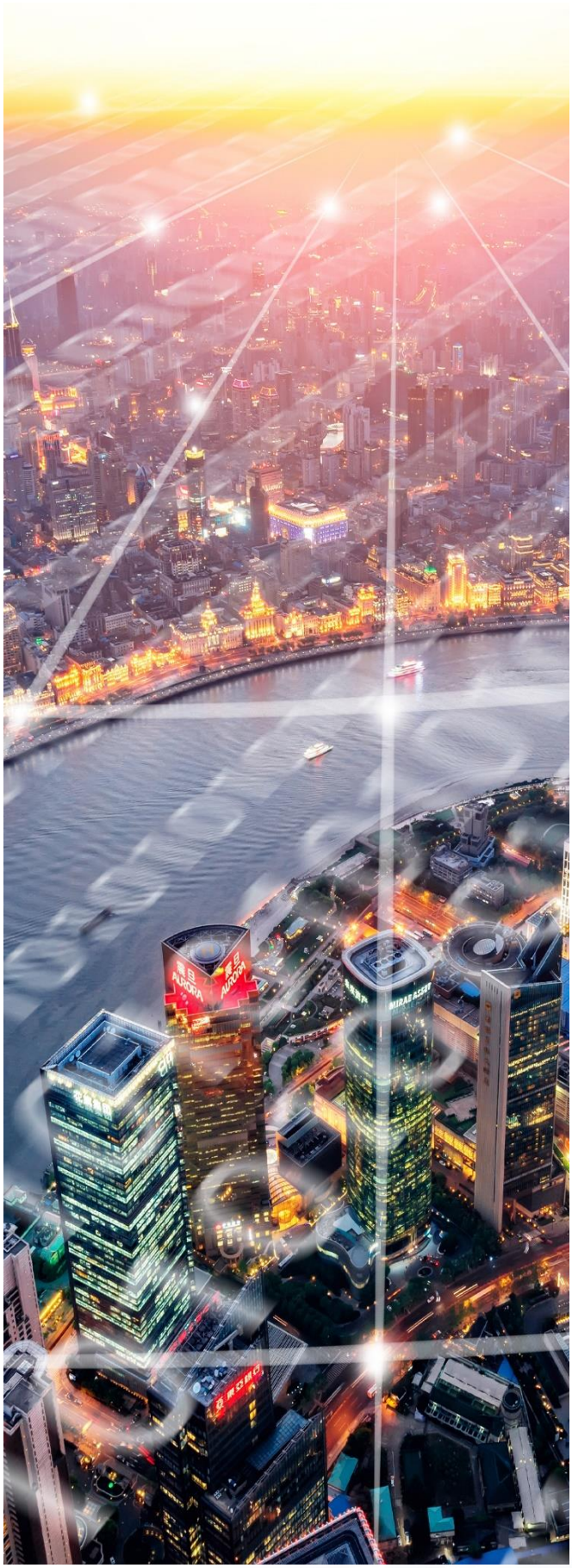
Strong R&D Strength

Standards leaders and outstanding contributors in the IP standards field;

Huawei-developed software VRP platform, focusing on innovation for 17 years

Honors and Certifications

Huawei has won multiple international awards, such as the SDN-VDC InfoVision Award and the Japan INTERROP Gold Award, and has been certified by multiple third-party authorities around the world.



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