Huawei NetEngine5000E Cluster Router

HUAWEI TECHNOLOGIES CO., LTD.

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Huawei NetEngine5000E cluster router (NE5000E) delivers industry-leading huge capacity, carrier-level availability and green design, which fully guarantees the network robustness, service flexibility and TCO saving for service providers. Powered advanced backplane connection design, distributed and highly scalable Versatile Routing Platform (VRP) operating system, NE5000E, a super-core routing platform, service steadily and high-efficiency at internet backbone, metro core, internet data center and Internet bearer network.

Offering the innovative and advanced solutions such as the industry-largest capacity board, back-to-back cluster system and hybrid-chassis cluster system, the NE5000E makes network configured on demand and helps customer improve earnings, as well as save TCO.

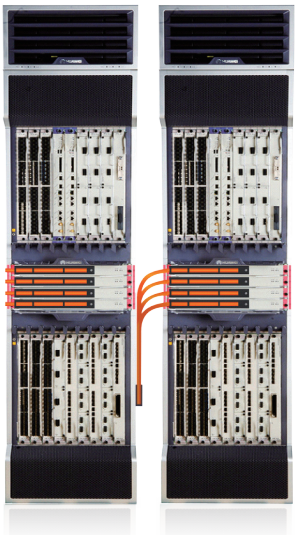
The NE5000E has two parts in hardware: Cluster Central Chassis (CCC) and Cluster Line Chassis (CLC). CLC is used to forward service flow and CCC is used to connect CLC's control plane and data plane in cluster system.

Highlights of NE5000E

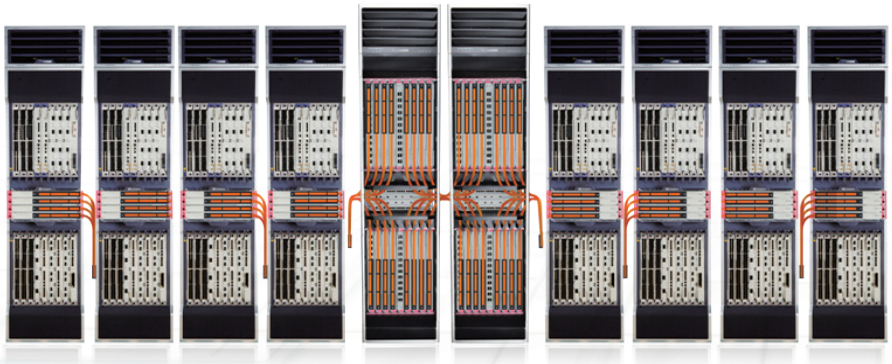
» Huge capacity, Sustainable evolution

Huawei was the first to launch NE5000E 2+8 cluster with 40G Line Process Unit (LPU) in April 2008, leading the Internet to 10T era. The capacity can be up to 25T with 100G LPUs and 102.4T with 400G LPUs. NE5000E cluster system supports single chassis mode and multi chassis cluster modes, such as back-to-back, 2+4, 2+8. The future-oriented design ensures the cluster system to be expanded to 16+64 multi-chassis with 819Tbps system capacity. The large capacity of cluster can meet the requirement of extra-large bandwidth service deployment.

Single Chassis



Back–to–Back Cluster System



2+8 Cluster System

Huawei continuously devotes high-end router R&D, and helps customers build more efficient network. Huawei firstly launched NE5000E 2+8 cluster with 40G LPUs in 2008 and led the 10T era of Internet. The end-to-end 100G solution combining 100GE+100G WDM was released by Huawei next year. Huawei released the 200G LPU in 2011, and won the InfoVision award. The high density 480G fixed LPU and 400G flexible LPU both were released in 2012. The LPUF-400 supports flexible sub-card deployed on demand. The latest release is the 100T 2+8 cluster based on 400G LPUs and new 1Tbps LPU in 2013.

» High availability, Enhanced network robustness

NE5000E provides all-round protections for reliability guarantee. For device-level protection, NE5000E has a passive backplane, with all the key parts of the device hot-swappable, hot-pluggable and hot-backup. NE5000E supports non-stop routing (NSR) for control and data plane. NE5000E provides hot-patching and comprehensive In-Service Software Upgrade (ISSU) technology for smooth upgrade of the software. For network-level protection, NE5000E supports comprehensive high-availability mechanisms, such as IGP fast convergence, IP/LDP/TE FRR, BGP/ISIS Auto FRR, BGP/ISIS/OSPF/LDP/PIM GR, VRRP, BFD and Trunk, which will effectively ensure the network operation with high reliability. As a result, NE5000E system exceeds 99.999% carrier-class reliability.

Adopting innovative In-service Hardware Expansion (ISHE) technology, NE5000E can be expanded smoothly. It is the most flexible core router in industry and meets the requirement of continuous expansion. High-speed Optical Flexible Card (OFC) of cluster can be configured on demand and the switch mode of fabric chipset can be configured flexibly. All these innovative core features are integral part of In-service Hardware Expansion (ISHE) technology, which not only improves the availability of network, but also protects investment of the customers for decades to come.

» Green philosophy, TCO saving greatly

NE5000E is designed with green concepts from the beginning. NE5000E core chipset, with 32nm technology, reduces power consumption of 30％ . The adoption of the cycling air heat dissipation system in CCC greatly improves the dissipation efficiency, reduces dissipation power consumption of 50 ％ . It adopts linked OFC, which can be configured flexibly as required. The compact design of the chassis reduces the size and weight of the device and needs no modification to the equipment room. NE5000E cluster system is truly “All-Green” in design, deployment and operation.

Huawei released industry 1st NE5000E back-to-back cluster in 2006, and less site room space and power consumption, reducing 45% TCO for customers. The back-to-back cluster with 400G LPUs supports 25.6Gbps of system capacity, and meets the requirement of business development in 3-5 years. NE5000E back-to-back cluster smoothly upgrades to multi chassis system, and is the most cost-effective cluster solution.

The main specifications of NE5000E are listed in the following tables:

NE5000E Specification

Attribute	Description
Throughput capability	• Non–block switch fabric, support multi Chassis • The maximum system capacity: 819Tbps/64 Chassis (400G)
Port capacity	15Tbps/ single Chassis (480G)
Slots/CLC	16 slots/ single Chassis
Interface Types	GE、10GE、155M POS、622M POS、2.5G POS、10G POS、40G POS、40GE、100GE
Routing protocol	• IPv4 static route, OSPF, IS–IS, BGP, PIM, MSDP, MBGP
IPv6	• IPv4 & IPv6 dual stack; IPv6 line speed forwarding based on hardware • IPv6 static route, BGP4+, RIPng, OSPFv3, IS–ISv6 • IPv6 peer discovery, PMTU discovery, TCP6, ping IPv6, Tracert IPv6, socket IPv6, TFTP IPv6 client, IPv6 policy route , IPv6 NetStream, etc • Manually configured tunnel, automatic tunnel, 6 to 4 tunnel
High Availability	• 1:1 standby for MPU, 3+1 backup switching fabric, 8+8 backup for power supply and 2+2 back for fan • hot swappable based on state，Non–stop Forwarding (NSF) and Non–stop Routing (NSR) • BFD for VRRP/BGP/OSPF/ISIS/TE LSP/LDP/ LSP/TE and PIM • IGP/BGP/Multicast Fast Convergence • IP/LDP/BGP/TE Fast Re–Route (FRR), BGP/ISIS Auto FRR,ETH Trunk, IP Trunk • In–Service Software Upgrade (ISSU), Automatic fault diagnosis function, Hot Patching • Configuration Management • Bi–Direction Compatible

NE5000E CLC Specification

Attribute	Description
Dimension (W × D × H)	442mm × 650mm × 1778mm (17.4 in. × 25.6 in. × 70.0 in.)
Max. Power Consumption	10000 W (full configuration of 400G LPUs)
Weight	364kg(802 lb) (full configuration of 400G LPUs)

NE5000E CCC Specification

Attribute	Description
Dimension (W × D × H)	442mm × 850mm × 1955mm (17.4 in. × 33.5 in. × 77.0 in.)
Power Consumption	4300W(2+2 Cluster based on full configuration of 400G LPU)
Weight	420kg (925.9 lb)

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