

# NE40E Universal Service Router



## Product Overview

The NE40E series universal service router (USR), a high-end network product, features line-rate forwarding capability, a well designed Quality of Service (QoS) mechanism, strong service-processing capability, and excellent expansibility and are usually deployed at the edges of Internet Protocol (IP) backbone networks, IP Metropolitan Area Networks (MANs), Internet Data Centers (IDCs) networks and other large-scale IP networks. The NE40E

can provide comprehensive services for enterprises, residential as universal edge device.

Based on distributed hardware forwarding and non-blocking switching technologies, the NE40E provides maximum 480G line cards to satisfy the increased demand for bandwidth.

## Appearance

The NE40E series includes the NE40E-X16A/X16, NE40E-X8A/X8, NE40E-X3 to satisfy the requirement of various scales network.



## Product Features

### Extremely Large Capacity Line Card

The NE40E can support maximum 480G Line Card, which fulfills with the increased network requirements of customers. The powerful 480G line card can support both 100GE and 10GE port types, which can provide customer a flexible configuration. Excelling by the developed chipset technology and fine design technique, NE40E must provide sustainable high bandwidth capacity in the future.

reduces power consumption, with less than 1 W for each gigabit, lowest in the industry.

### Energy Saving Design

The NE40E uses Huawei-developed Solar chips, which are reliable and secure. It can dynamically allocate and manage multi-core NP resources and automatically disable redundant or unused ports, buses, and chips. The NE40E also supports dynamic frequency adjustment and intelligent fan speed adjustment, which significantly

### Future-Oriented IPv6-Compatible Solutions

The NE40E supports a variety of IPv6 features including IPv6 leased line, dual stack, tunneling, and translation. The NE40E supports Next Hop Separation to optimize the IPv6 convergence time, supports larger IPv6 FIB and CGN card of 160G throughput to improve the scalability. All of them help to provide comprehensive solutions based on the high performance for transition from IPv6 to IPv4. And owing to the variety of technologies and different situations of provider networks, each provider will certainly select a conservative, reposeful, or aggressive transition technology that is the most suitable for its own network.



## All-Round Reliability Solution

The NE40E provides reliability protection at different levels, including the equipment level, network level, and service level. The NE40E can provide a multi-level reliability solution that completely meets the reliability requirements of different services. The NE40E lays the foundation for enterprise services with a system availability of 99.999%.

The following describes the reliability protection levels that the NE40E provides:

### Equipment-level reliability

The NE40E provides redundancy backup for key components. These key components support hot swapping and hot backup. The NE40E also uses technologies, such as non-stop routing (NSR), non-stop forwarding (NSF), and in-service software upgrade (ISSU), to ensure uninterrupted service forwarding. The NE40E supports packet buffering of 200 ms, ensuring no packet loss in the case of burst traffic. This guarantees high-quality service experience of users.

### Network-level reliability

The NE40E uses the following technologies to provide network-level reliability: IP fast reroute (FRR), Label Distribution Protocol (LDP) FRR, VPN FRR, TE FRR, hot standby, fast convergence of Interior Gateway Protocols (IGP), BGP, and multicast routes, Virtual Router Redundancy Protocol (VRRP), Rapid Ring Protection Protocol (RRPP), trunk load balancing and backup, hardware-based Bidirectional Forwarding Detection (BFD) of 3.3 ms, MPLS OAM, Ethernet OAM, and routing protocol/port/VLAN damping. The NE40E provides an

end-to-end protection with no service interruption.

### Service-level reliability

The NE40E uses the following technologies to provide service-level reliability for L2VPNs and L3VPNs: VPN FRR, E-VRRP, VLL FRR, Ethernet OAM, Y.1731, PW redundancy, E-Trunk, and E-Automatic Protection Switching (APS). These technologies ensure stable and reliable service operation with no service interruption.

## Enhanced Metro Ethernet Features

Based on the mature Versatile Routing Platform (VRP), the NE40E excels in reliability, expansibility, and maintainability. It supports various features to satisfied the multi services carried requirement including Hierarchical Virtual Private LAN Service (HVPLS), Virtual Leased Line (VLL), Layer 2 VPN (L2VPN), Layer 3 VPN (L3VPN), multicast VPN, 802.1Q-in-802.1Q (QinQ), Virtual Local Area Network (VLAN) mapping, Dynamic Host Configuration Protocol (DHCP) relay/snooping, IPSec, NAT and GRE. NE40E supports Protocol Independent Multicast-Source Specific Multicast (PIM-SSM), Internet Group Membership Protocol Version 3 (IGMPv3), and MAC+IP+VLAN user binding. On the high-reliability MANs based on the NE40E, ISP can provide Internet Protocol Television (IPTV) services, family multi-play services, IP leased line services, enterprise interconnection services, and enterprise VPN services.

In addition, the NE40E supports comprehensive Ethernet clock synchronization, which well satisfies the requirements for IP network used in electricity and transportation enterprise.





## Enhanced User Management Functions

The NE40E provides Multi Service Edge (MSE) features to manage and control DHCP/IP over Ethernet (IPoE)/leased line access users. The MSE mainly provides dynamic user access, user management, and user-based authentication, accounting, and QoS scheduling. In addition, the MSE implements Bandwidth on Demand (BoD) for different services of enterprise users and for DHCP individual users and changes the unified charging mode to the charging mode based on value-added services, which implements usercentered refined service operation.

## Efficient OAM features

NE40E support Ethernet OAM fault management including: Ethernet in the First Mile OAM (EFM OAM), conforming to IEEE 802.3ah and Connectivity Fault Management OAM (CFM OAM), conforming to IEEE 802.1ag.

Conforming to ITU-T Y.1731, the NE40E supports performance management to measure the delay, jitter, and packet loss ratio when the messages are transmitted. In this manner, the NE40E can detect the end-to-end performance of traffic in a specified time period and on a specified network segment.

Cooperating with performance management tools such as U2000, NE40E can provide SDH like network OAM, service oriented, intelligent warning, and refined positioning. With supporting efficient and precise performance measurement and test technologies such as IP FPM, TWAMP, RFC2544, G.8032, NE40E can help to simplify the OAM and save the OPEX to a great extent. Besides, the ISP can monitor the network status in real time through the NMS. The ISP then check whether the forwarding capacity of the network complies with the Service Level Agreement (SLA) signed with users and locate faults. The ISP does not need to carry out detection on the user side, which greatly decreases maintenance costs.

## Product Specifications

Item	NE40E-X16A	NE40E-X16	NE40E-X8A	NE40E-X8	NE40E-X3
Number of slots	22 slots, including 2 MPUs (1:1 backup), 4 SFUs (3+1 backup), and 16 LPUs	22 slots, including 2 MPUs (1:1 backup), 4 SFUs (3+1 backup), and 16 LPUs	12 slots, including 2 SRUs (1:1 backup), 2 SFUs (3+1 backup), and 8 LPUs	11 slots, including 2 SRUs (1:1 backup), 1 SFUs (2+1 backup), and 8 LPUs	5 slots (for 3 LPUs and 2 MPUs)
Dimensions (H x W x D)	442mm x 650mm x 1778mm (40U)	1420 mm x 442 mm x 650 mm (32 U)	442mm x 650mm x 934mm (21U)	620 mm x 442 mm x 650 mm (14 U)	175 mm x 442 mm x 650 mm (DC, 4 U) 220 mm x 442 mm x 650 mm (AC, 5U)
Power consumption (in full configuration)	9040W (480G)	4610 W (120G) 7970 W (240G)	4770W (480G)	2340 W (120G) 4100 W (240G)	1070 W (AC) 920 W (DC)
Weight (in full configuration)	356kg (480G)	246 kg (120G) 279 kg (240G)	186kg (480G)	119 kg (120G) 136 kg (240G)	42 kg (DC) 52 kg (AC)
Interface type	100GE/40GE GE/FE OC-48c/STM-16c POS OC-3c/STM-1c POS Channelized OC-3/STM-1 OC-12c/STM-4c ATM CE1/CT1	10GE- LAN /WAN OC-192c/STM-64c POS OC-12c/STM-4c POS Channelized STM-4 OC-3c/STM-1c ATM E3/CT3 E1/T1			
IPv4	<ul style="list-style-type: none"> <li>IPv4 static routes and dynamic routing protocols, such as RIP, OSPF, IS-IS, and BGP4</li> <li>Line rate forwarding on all interfaces in complex routing environments</li> <li>Various IPv4-to-IPv6 transition technologies: manual tunnel, automatic tunnel, 6to4 tunnel, GRE tunnel, and ISATAP tunnel</li> <li>IPv4 over IPv6 tunnel and IPv6 Provider Edge (6PE)</li> </ul>				
IPv6	<ul style="list-style-type: none"> <li>IPv6 static routes and dynamic routing protocols, such as BGP4+, RIPng, OSPFv3, and IS-ISv6</li> <li>IPv6 neighbor discovery, PMTU discovery, TCP6, ping IPv6, tracer IPv6, socket IPv6, static IPv6 DNS, IPv6 DNS server, TFTP IPv6 client, and IPv6 policy-based routing</li> <li>Internet Control Message Protocol Version 6 (ICMPv6) Management Information Base (MIB), User Datagram Protocol Version 6 (UDP6) MIB, TCP6 MIB, and IPv6 MIB</li> <li>L2NAT, NAT444, DS-Lite, and NAT64</li> </ul>				
MPLS	<ul style="list-style-type: none"> <li>MPLS TE, P2MP TE/mLDP, and MPLS/BGP VPN, in compliance with RFC 2547</li> <li>Three inter-AS implementations, integrated with Internet services</li> <li>Martini and Kompella MPLS L2VPN, L2VPN techniques such as VPLS and VLL, and IP interworking over heterogeneous media</li> <li>Multicast VPN</li> <li>MPLS TP</li> </ul>				
Layer 2 features	<ul style="list-style-type: none"> <li>IEEE 802.1Q, IEEE802.1ad, IEEE 802.1D, IEEE 802.1w, and IEEE 802.1s</li> <li>VLAN aggregation (super VLAN)</li> <li>1483B and filtering list based on MAC addresses and ports</li> </ul>				

Item	NE40E-X16A	NE40E-X16	NE40E-X8A	NE40E-X8	NE40E-X3
Reliability	<ul style="list-style-type: none"> <li>• IP/LDP/VPN/TE/VLL FRR, and IP/TE auto rerouting</li> <li>• IGP/BGP/ multicast route convergence, VRRP, RRPP, and IP trunk load balancing and backup</li> <li>• Hardware-based BFD of 3.3 ms, MPLS/Ethernet OAM, Y.1731, and routing protocol/port/VLAN damping</li> <li>• PW redundancy, E-Trunk, E-APS, and E-STP</li> <li>• In-service patching for smooth software upgrade</li> </ul>				
QoS	<ul style="list-style-type: none"> <li>• Passive backplane design: backup for key components such as route processing modules, SFUs, and power modules to guard against single points of failure</li> <li>• Switching between components that hot back up each other, graceful restart (GR), NSF, NSR, and ISSU</li> <li>• Hot swap of all components</li> <li>• Well-designed HQoS and advanced scheduling and congestion avoidance technologies on each LPU</li> <li>• Accurate traffic policing and traffic shaping</li> </ul>				
OAM	<ul style="list-style-type: none"> <li>• Complex rule definition and fine-grained flow identification</li> <li>• MPLS HQoS, ensuring QoS for MPLS VPN, VLL, and PWE3 services</li> <li>• DS-TE that combines MPLS TE and the DiffServ model and 8CT</li> <li>• TE-tunnel-oriented QoS</li> <li>• Y.1731, IP FPM, RFC 2544, MPLS OAM, 802.1ag, and 802.3ah</li> <li>• IGMPv1, IGMPv2, and IGMPv3</li> </ul>				
Multicast	<ul style="list-style-type: none"> <li>• Static multicast and multicast protocols, including PIM-DM, PIM-SM, PIM-SSM, Multicast Source Discovery Protocol (MSDP), and Multiprotocol BGP (MBGP)</li> <li>• Multicast CAC</li> <li>• Interoperability between multicast protocols</li> <li>• Processing of multicast policies (multicast routing protocols and multicast forwarding policies), multicast QoS, and multicast replication for IPoE access users</li> </ul>				
Security	<ul style="list-style-type: none"> <li>• Two-level multicast replication on the SFUs and LPUs to optimize the multicast effect</li> <li>• ACL-based packet filtering</li> <li>• URPF</li> <li>• GTSM</li> <li>• DHCP snooping</li> </ul>				
Value-added services	<ul style="list-style-type: none"> <li>• ARP attack defense and DoS attack defense</li> <li>• MAC address limit and MAC-IP binding</li> <li>• Secure Shell (SSH) and SSHv2</li> <li>• IPsec tunnel</li> <li>• Distributed GRE tunnel</li> <li>• Distributed NetStream</li> </ul>				
Environment requirements	<ul style="list-style-type: none"> <li>• High-precision NAT: CGN</li> <li>• Long-term operating temperature: 0°C to 45°C</li> <li>• Short-term operating temperature: -5°C to +55°C</li> <li>• Long-term operating humidity: 5% RH to 85% RH</li> <li>• Short-term operating humidity: 0% RH to 100% RH</li> <li>• Operating altitude: ≤ 3000 meters</li> </ul>				

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