



## NE40E Universal Service Router

### Introduction

The NetEngine40E series universal service router (NE40E) is a high-end network product provided by Huawei Technologies Co., Ltd. NE40Es are usually deployed at the edges of Internet Protocol (IP) backbone networks, IP Metropolitan Area Networks (MANs), and other large-scale IP networks. The NE40E, NE80E, and NE5000E together provide a complete, layered IP network solution.

The NE40E can be flexibly deployed at the edge or core of IP or MPLS networks, simplifying network structure. With its ability to provide an extensive range of services and reliable service quality, the NE40E is driving IP and MPLS bearer networks to develop greater broadband capacity and to become more secure, more intelligent, and more service-oriented. Based on distributed hardware forwarding and non-blocking switching technologies, the NE40E features line-rate forwarding capability, a well designed Quality of Service (QoS) mechanism, strong service-processing capability, and excellent expansibility. The NE40E is based on a 400G platform and provides 100G line cards to satisfy the increased demand for bandwidth. Compatible with all line cards currently in use, the NE40E minimizes investment needs.

### Appearance

The NE40E series includes the NE40E-X16, NE40E -X8, NE40E -X3 and NE40E-8 to satisfy the requirement of various scales network.



NE40E-X16



NE40E-X8



NE40E-X3



NE40E-8

### Product Highlights

#### Enhanced IPTV Service Functions



The NE40E has a built-in video caching function, providing users with a smooth IPTV experience. Based on fast channel change (FCC), retransmission request (RET) and inline Real-time Stream Monitoring, the NE40E can improve the user experience, optimize the OAM, save bandwidth resources and reduce the total cost of ownership (TCO) over the entire network.

#### **Enhanced User Management Function**

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 user-centered refined service operation.

#### **Future-Oriented IPv6-Compatible Solutions**

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

#### **All-round Reliability Solution**

Providing reliability protection at different levels, including the equipment level, network level, and service level, the NE40E can cope with various kinds of bearer network failures and ensure service recovery. Based on these the NE40E provides a multi-level solution that can meet the requirements of the whole network and completely satisfy carrier-class reliability requirements. The NE40E acts as a foundation on which to build carrier-class services with system availability at 99.999%.

- **Equipment-level reliability:** The NE40E provides redundancy backup for key components. These components support hot swapping and hot backup. The NE40E also makes use of Non-Stop Routing (NSR), Non-Stop Forwarding (NSF), In-Service Software Upgrade (ISSU) and other technologies to improve services recovery



capability and ensure continuous service forwarding.

- **Network-level reliability:** The NE40E supports IP/Label Distribution Protocol (LDP)/VPN/ TE Fast Reroute (FRR), hot-standby, fast convergence of Interior Gateway Protocols (IGPs), BGP and multicast routing, Virtual Router Redundancy Protocol (VRRP), Rapid Ring Protection Protocol (RRPP), trunk link backup, Bidirectional Forwarding Detection (BFD), MPLS/Ethernet Operation Administration, and Maintenance (OAM), and routing protocol/port/VLAN damping technologies to ensure the stability of the whole network. The NE40E provides an end-to-end network protection solution that can, in the event of a failure, guarantee service recovery within 200 ms.

- **Service-level reliability:** The VPN FRR, E-VRRP, VLL FRR, Ethernet OAM, Y. 1731, PW redundancy, E-Trunk, and E-Automatic Protection Switching (APS) technologies provided by the NE40E can be applied to L3VPN and L2VPN networking solutions. These provide service-level redundancies to ensure the stable and reliable delivery of services and to ensure continuous service forwarding.

### **Energy Saving Design**

The environmentally friendly design of the NE40E saves energy and reduces emissions. The NE40E has an industry-leading cooling and energy-saving system which includes advanced ventilation and optimal heat dissipation design, intelligent fans, and a design for power supply distribution. By automatically sensing and adjusting temperature, the NE40E improves power supply utilization, making it an outstanding energy saver.

### **Enhanced Metro Ethernet Features**

Based on the mature Versatile Routing Platform (VRP), the NE40E excels in reliability, expansibility, and maintainability. The NE40E is an ideal platform for operators to build up carrier-class MANs. 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) server/replay/snooping, IPSec 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 carrier-class MANs based on the NE40E, operators can provide Internet broadband access services, 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 carrier-class FMC service development in the MAN.

### Specification

Attribute	NE40E-X16	NE40E -X8	NE40E -X3	NE40E-8
<b>Switching Capacity</b>	12.58 Tbps	7.08 Tbps	1.08 Tbps	640Gbps
<b>Forwarding Performance</b>	3200 Mpps	1600 Mpps	300 Mpps	400 Mpps
<b>Number of Slots</b>	22 slots, including 2 MPUs (1:1 backup), 4 SFUs (3 + 1 backup), and 16 LPUs	11 slots, including 2 SRUs (1:1 backup), 1 SFUs (2+1 backup), and 8 LPUs	5 slots, including 2 MPUs (1:1 backup) and 3 LPUs	12 slots, including 2 SRUs (1:1 backup), 2 SFUs (3+1 backup), and 8 LPUs
<b>Dimension (W×D×H)</b>	442mm×650mm×1420mm(32U)	442mm×650mm×620mm(14U)	442mm×650mm×175mm (DC 4U) 442mm×650mm×220mm (AC 5U)	442mm×669mm×886mm(20U)
<b>Maximum power consumption</b>	5360W(40G) 6500W(100G)	2800W(40G) 3300W(100G)	1100W	2200W
<b>Weight in full configuration</b>	267kg	130kg	41kg (DC) 51kg (AC)	147kg
<b>Interface type</b>	10GE- LAN /WAN GE/FE OC-192c/STM-64c POS OC-48c/STM-16c POS OC-12c/STM-4c POS OC-3c/STM-1c POS Channelized OC-3/STM-1 OC-3c/STM-1c ATM OC-12c/STM-4c ATM E3/CT3 CE1/CT1 E1/T1			
<b>IPv4</b>	Supports the static routing protocol and IPv4 dynamic routing protocols such as RIP, OSPF, IS-IS, and BGP-4.			



<p><b>IPv6</b></p>	<p>Supports various technologies for transition from IPv4 to IPv6: manual tunnel configurations, automatic tunnel configurations, IPv6-to-IPv4 (6-to-4) tunneling, Generic Routing Encapsulation (GRE) tunneling, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunneling.</p> <p>Supports IPv4 over IPv6 tunneling and IPv6 Provider Edge Router (6PE).</p> <p>Supports the IPv6 static routing protocol.</p> <p>Supports IPv6 dynamic routing protocols such as RIP Next Generation (RIPng), OSPFv3, IS-ISv6, and BGP4+.</p> <p>Supports IPv6 neighbor discovery and path Maximum Transmission Unit (PMTU) discovery.</p> <p>Supports Transmission Control Protocol Version 6 (TCP6), ping IPv6, traceroute IPv6, socket IPv6, static IPv6 Domain Name System (DNS), specifying the IPv6 DNS server, Trivial File Transfer Protocol (TFTP) IPv6 client, and IPv6 policy-based routing.</p> <p>Supports Internet Control Message Protocol Version 6 (ICMPv6) Management Information Base (MIB), User Datagram Protocol Version 6 (UDP6) MIB, TCP6 MIB, and IPv6 MIB.</p>
<p><b>MPLS</b></p>	<p>Supports LDP over TE, VPLS, H-VPLS, policy-based routing in VPN.</p> <p>Supports MPLS L2VPNs in either Martini or Kompella mode.</p> <p>Supports VLL/VPLS access L3VPNs.</p> <p>Supports QinQ, MPLS/BGP L3VPN, and inter-AS VPN Option A/B/C.</p> <p>Supports Asynchronous Transfer Mode (ATM) E1, Inverse Multiplexing over ATM (IMA), and Time-Division Multiplexing (TDM) PWE3.</p> <p>Supports MPLS-TP</p>
<p><b>Layer 2 feature</b></p>	<p>Supports IEEE802.1q, IEEE802.1p, IEEE 802.3ad, and IEEE 802.1ab.</p> <p>Supports the Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), RRPP, DHCP+, VLAN switching, and user binding.</p>
<p><b>Reliability</b></p>	<p>Supports BGP GR, IS-IS GR, and OSPF GR.</p> <p>Supports LDP GR, Resource-Reservation Protocol (RSVP) GR, and Non-Stop Forwarding (NSF).</p> <p>Supports VLL/VPLS/L3VPN GR/NSF.</p> <p>Supports multicast NSF.</p> <p>Supports BGP/IS-IS/OSPF/LDP/RSVP-TE/PIM/ISSU Non-Stop Routing (NSR).</p> <p>Supports In-Service Software Upgrade (ISSU).</p> <p>Supports fast convergence of Interior Gateway Protocols (IGPs), BGP, and multicast routing</p> <p>Supports IP/LDP/VPN/TE/VLL FRR.</p> <p>Supports IP Auto FRR.</p> <p>Supports BFD for the static routing protocol and protocols such as IS-IS, RSVP, LDP, TE, Label Switched Path (LSP), PW, OSPF, BGP, VRRP, PIM, and RRPP.</p>



	<p>Supports RRPP.</p> <p>Supports MPLS OAM and Ethernet OAM, Y.1731.</p> <p>Supports backup of service routers, PW redundancy, and PWE3 end-to-end protection.</p> <p>Supports E-Trunk, E-APS, E-STP.</p>
<b>QoS</b>	<p>Supports Weighted Random Early Detection (WRED), DS-TE capability with a maximum of eight CTs, five-level H-QoS scheduling, VLL/PWE3 QoS, and MPLS H-QoS.</p> <p>Supports the last mile QoS.</p> <p>Supports multicast replication of IPoE access users.</p>
<b>Multicast</b>	<p>Supports IGMPv1, IGMPv2, IGMPv3, IGMP snooping, multicast VPN, and IPv6 multicast.</p> <p>Supports static multicast routes.</p> <p>Supports multicast routing protocols: PIM-DM, PIM-SM, PIM-SSM, Multicast source Discovery Protocol (MSDP), and Multi protocol BGP (MBGP).</p> <p>Supports the deployment of both multicast and TE.</p> <p>Supports multicast CAC.</p>
<b>User management</b>	<p>Supports management over access users such as IP over X (IPoX) access users.</p> <p>Supports user authentication protocols, such as Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), Microsoft CHAP (MSCHAP), Remote Authentication Dial In User Service (RADIUS), and Huawei Terminal Access Controller Access Control System (HWTACACS).</p> <p>Supports user accounting protocols, such as RADIUS, HWTACACS, and Common Open Policy Service (COPS).</p> <p>Supports user authorization protocols, such as RADIUS, HWTACACS, and COPS.</p> <p>Supports protocols such as COPS and Change of Authorization (CoA).</p>
<b>Security</b>	<p>Supports ACL filtering, URPF, GTSM, DHCP Snooping,</p> <p>Supports anti-ARP attack、 anti-DOS attack</p> <p>Supports MAC address limitation, bonding between MAC and IP</p> <p>Supports SSH, SSH v2</p> <p>Supports NetStream</p> <p>Supports IPsec.</p>
<b>Clock transmission</b>	<p>Supports Adaptive Clock Recovery (ACR), Differential Clock Recovery (DCR), Ethernet clock synchronization, and IEEE 1588v2.</p>
<b>IP RAN</b>	<p>Supports TDM PWE3 and ATM PWE3</p> <p>Supports ATM IMA</p> <p>Supports MPLS-TP</p> <p>Supports CSG Plug-and-Play</p>



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<b>Environmental requirements</b>	Long-term ambient temperature: 0oC to 45oC Short-term ambient temperature: -5oC to +55oC Temperature change rate: 30oC/hour Long-term relative humidity: 5% to 85%, non-condensing Short-term relative humidity: 0% to 95%, non-condensing Working altitude: lower than 3000 meters
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