Huawei CX600 Metro Services Platform

HUAWEI TECHNOLOGIES CO., LTD.

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Product Overview

The CX600 Metro Services Platform (CX600) is designed with the routing platform to provide solutions for the carrier-class Metropolitan Area Network (MAN) that features Fixed-Mobile Convergence (FMC). The solutions provided by the CX600 cover the areas of access, convergence and transmission. CX600s, in general, are deployed at the access and convergence layers of the carrier-class MAN.

Based on distributed hardware forwarding and non-blocking switching technologies, the CX600 features carrier-class reliability, line speed forwarding capability, a well-designed Quality of Service(QoS) mechanism, strong service-processing capability, and excellent expansibility. In addition to providing competitive Layer 2 services, including Ethernet access and convergence, Ethernet switching, and transmission of Ethernet over Multi-Protocol Label Switching (EoMPLS) services, the CX600 provides diverse Layer 3 (IP) services, such as Internet broadband services, triple play (video, voice, and data) services for individual users as well as IP leased line and IP Virtual Private Network (VPN) services for enterprise users. Based on enhanced video features including fast channel change (FCC), retransmission request (RET) and inline Real-time Stream Monitoring the CX600 can improve user experience in the IPTV service.

The CX600 series includes the CX600-X16, CX600-X8, and CX600-X3, thus satisfying networking requirements for networks of various scales.

CX600-X16

CX600-X8

CX600-X3

Product Highlights

Extremely Large Capacity Line Card

The CX600 can support maximum 240G Line Card, which fulfills with the increased network requirements of customers. The powerful 240G 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, CX600 must provide sustainable high bandwidth capacity in the future.

Enhanced Metro Ethernet Features

Based on the mature Versatile Routing Platform (VRP), the CX600 excels in reliability, expansibility, and maintainability. The CX600 is an ideal platform for operators to build up carrier-class MANs. It supports various features 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, 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 CX600, 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 CX600 supports comprehensive clock synchronization solution, which well satisfies the requirements for carrier-class FMC service development in the MAN.

Future-Oriented IPv6-Compatible Solutions

The CX600 supports a variety of IPv6 features including IPv6 leased line, NAT, dual stack, tunneling, and translation. The CX600 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, reposeful, or aggressive transition technology that is the most suitable for its own network.

Well-designed QoS Mechanism

The CX600 provides high-quality QoS by using multiple service traffic classification methods and identification policies to flexibly differentiate services and thus to ensure fair scheduling. The CX600 uses the following functions to ensure QoS:

- Priority Queuing (PQ)
- Weight Round Robin (WRR), and Weighted Fair Queuing (WFQ)
- Flow-based scheduling, which facilitates the implementation of MPLS Traffic Engineering (TE).
- Differentiated Service (DiffServ) and Integrated Service (InterServ) mechanisms, which combines the use of MPLS TE and the DiffServ model.
- MPLS DS-TE capability with a maximum of eight class types (CTs).
- Five-level Hierarchical QoS (HQoS) scheduling and QoS for MPLS VPN, VLL, and Pseudo Wire Emulation Edge to Edge (PWE3), which ensures end-to-end QoS deployment and proper configurations and efficient usage of network resources.
- Hardware-based QoS which ensures line-rate forwarding after QoS services are deployed.

Enhanced User Management Function

The CX600 provides Multi Service Edge (MSE) features to manage and control Point-to-Point Protocol over Ethernet (PPPoE)/IP over Ethernet (IPoE)/leased line access users. The MSE mainly provides 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 individual users then changes the unified charging mode to the charging mode based on value-added services, which implements user-centered refined service operation.

Industry Largest CGN Board

To achieve the IPv6 transition, the CX600 can provide the integrated CGN solution. The 80G and 160G CGN boards supported by CX600 are the industry largest capacity CGN boards. The large capacity CGN service board can also support maximum 64M session number and 2M/s session establishing rate. Besides, it can support the popular IPv6 transition solutions such as NAT44, DS-Lite, L2NAT and NAT64, and so on. In addition, the CGN board can achieve cross-chassis hot standby, which guarantees the high availability for the CGN services.

Carrier-Class Reliability

Based on the carrier-class design, the CX600 supports redundancy backup and hot swapping for all key components including SRUs, SFUs, power supply modules, fan modules, management buses, Monitor buses, and data buses. The CX600 also supports port binding, Virtual Router Redundancy Protocol (VRRP), and Rapid Ring Protection Protocol (RRPP) to ensure continuous service forwarding in the case of link faults. With graceful restart (GR), fast convergence, and key technologies such as Bidirectional Forwarding Detection (BFD), IP Fast Reroute (FRR), Label Distribution Protocol (LDP) FRR, TE FRR, VPN FRR, VLL FRR, the CX600 ensures that services are converged within 50 ms when abnormalities occur, thus ensuring continuous services. In addition, the CX600 supports MPLS OAM, Ethernet OAM, Y.1731, PWE3, and backup protection of service routers. With the preceding features, the CX600 can achieve millisecond-level protection switchover of end-to-end services.For Mobile Backhaul networks, especially the future oriented LTE network, NE40E adopt advanced Hierarchical L3 solution, deploying HVPN the OAM more effective, and it can achieve E-to-E segment by segment fault demarcation and confirm each IP base station status.

Cooperating with performance management tools such as U2000, NE40E can provide SDH like network OAM, service oriented, intelligent warning, and refined positioning. 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.

Extensive Security Features

The CX600 can help operators monitor the network status and protect users against network attacks. The CX600 supports Address Resolution Protocol (ARP) attack defense and BGP session attack defense, and can flexibly control IP packets as required. In addition, the CX600 supports Generalized TTL Security Mechanism (GTSM) of OSPF and BGP, VPLS and L3VPN traffic statistics, DHCP snooping, lawful interception and IPSEC to build a secure and controllable network.

Efficient OAM features

CX600 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 CX600 supports performance management by inserting the timestamp into 802.1ag LB messages to measure the delay, jitter, and packet loss ratio when the messages are transmitted. In this manner, the CX600 can detect the end-to-end performance of traffic in a specified time period and on a specified network segment.

For MPLS TP OAM, CX600 can support functions such as Basic connectivity detection, LoopBack (LB), Link Trace (LT), Remote Defect Indication (RDI), AIS, Single-ended frame loss statistics collection and two-ended frame loss statistics collection, detecting One-way frame delay and two-way frame delay, VE interfaces support TP OAM, Dynamic PWs and MS-PWs support TP OAM.

For Mobile Backhaul networks, especially the future oriented LTE network, CX600 adopt advanced Hierarchical L3 solution, deploying HVPN technology, which can guarantee efficiency, security, and reliability. L3 to edge solution makes the OAM more effective, and it can achieve E-to-E segment by segment fault demarcation and confirm each IP base station status.

Cooperating with performance management tools such as U2000, CX600 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 extend. 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.

Specification

Attribute	CX600-X16	CX600 -X8	CX600 -X3
Switching Capacity	12.58 Tbps	7.08 Tbps	1.08 Tbps
Forwarding Performance	5760Mpps	2880Mpps	360Mpps
Number of Slots	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
Dimension (W×D×H)	442mm×650mm ×1420mm(32U)	442mm×650mm ×620 mm(14U)	442mm×650mm×175 mm(DC 4U) 442mm×650mm×220 mm(AC 5U)
Maximum power consumption	4610W(120G) 7970W(240G)	2340W(120G) 4100W(240G)	1070W(AC) 920W(DC)
Weight in full configuration	246kg (120G) 279kg (240G)	119kg (120G) 136kg (240G)	42kg (DC) 52kg (AC)
Interface type	100GE 10GE- LAN /WAN OC-768c/STM-256c POS OC-48c/STM-16c POS OC-3c/STM-1c POS OC-3c/STM-1c ATM E3/CT3 E1/T1	40GE GE/FE OC-192c/STM-64c POS OC-12c/STM-4c POS Channelized OC-3/STM-1 OC-12c/STM-4c ATM CE1/CT1	
IPv4	Supports the static routing protocol and IPv4 dynamic routing protocols such as RIP, OSPF, IS-IS, and BGP-4.		
IPv6	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) tunnels. Supports IPv4 over IPv6 tunneling and IPv6 Provider Edge Router (6PE). Supports the IPv6 static routing protocol. Supports IPv6 dynamic routing protocols such as RIP Next Generation (RIPng), OSPFv3, IS-ISv6, and BGP4+. Supports IPv6 neighbor discovery and path Maximum Transmission Unit (PMTU) discovery. 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. Supports Internet Control Message Protocol Version 6 (ICMPv6) Management Information Base (MIB), User Datagram Protocol Version 6 (UDP6) MIB, TCP6 MIB, and IPv6 MIB. Supports L2NAT,NAT444,DS-Lite.		
MPLS	Supports LDP over TE, VPLS, H-VPLS, policy-based routing in VPN. Supports MPLS L2VPNs in either Martini or Kompella mode. Supports VLL/VPLS access L3VPNs. Supports QinQ, MPLS/BGP L3VPN, and inter-AS VPN Option A/B/C. Supports Asynchronous Transfer Mode (ATM) E1, Inverse Multiplexing		

	over ATM (IMA), and Time-Division Multiplexing (TDM) PWE3. Supports MPLS-TP.
Layer 2 feature	Supports IEEE802.1q, IEEE802.1p, IEEE 802.3ad, and IEEE 802.1ab. Supports the Spanning Tree Protocol (STP), Rapid Spanning Tree Protocol (RSTP), Multiple Spanning Tree Protocol (MSTP), RRPP, DHCP+, VLAN switching, and user binding.
Reliability	Supports BGP GR, IS-IS GR, and OSPF GR. Supports LDP GR, Resource-Reservation Protocol (RSVP) GR, and Non-Stop Forwarding (NSF). Supports VLL/VPLS/L3VPN GR/NSF. Supports multicast NSF. Supports BGP/IS-IS/OSPF/LDP/RSVP-TE/PIM/ISSU Non-Stop Routing (NSR). Supports In-Service Software Upgrade (ISSU). Supports fast convergence of Interior Gateway Protocols (IGPs), BGP, and multicast routing. Supports IP/LDP/VPN/TE/VLL FRR. Supports IP Auto FRR. 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. Supports RRPP. Supports MPLS OAM and Ethernet OAM, Y.1731. Supports backup of service routers, PW redundancy, and PWE3 end-to-end protection. Supports E-Trunk, E-APS, E-STP.
QoS	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. Supports the last mile QoS. Supports multicast replication of IPoE access users.
Multicast	Supports IGMPv1, IGMPv2, IGMPv3, IGMP snooping, multicast VPN, and IPv6 multicast. Supports static multicast routes. Supports multicast routing protocols: PIM-DM, PIM-SM, PIM-SSM, Multicast source Discovery Protocol (MSDP), and Multi protocol BGP (MBGP). Supports the deployment of both multicast and TE. Supports multicast CAC.
User management	Supports management over access users such as IP over X (IPoX) access users. 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). Supports user accounting protocols, such as RADIUS, HWTACACS, and Common Open Policy Service (COPS).
Security	Supports ACL filtering, URPF, GTSM, DHCP Snooping. Supports anti-ARP attack, anti-DOS attack. Supports MAC address limitation, bonding between MAC and IP. Supports SSH, SSHv2.

	Supports NetStream. Supports IPSec.
Clock transmission	Supports Adaptive Clock Recovery (ACR), Differential Clock Recovery (DCR), Ethernet clock synchronization, and IEEE 1588v2.
IP RAN	Supports TDM PWE3 and ATM PWE3. Supports ATM IMA. Supports MPLS-TP. Supports CSG Plug-and-Play. Supports IP FPM, TWAMP, RFC2544, G.8032.
Environmental requirements	Long-term ambient temperature: 0°to 45° Short-term ambient temperature: –5° to +55° Temperature change rate: 30°/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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Version No.: M3-031325-20120503-C-1.0

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