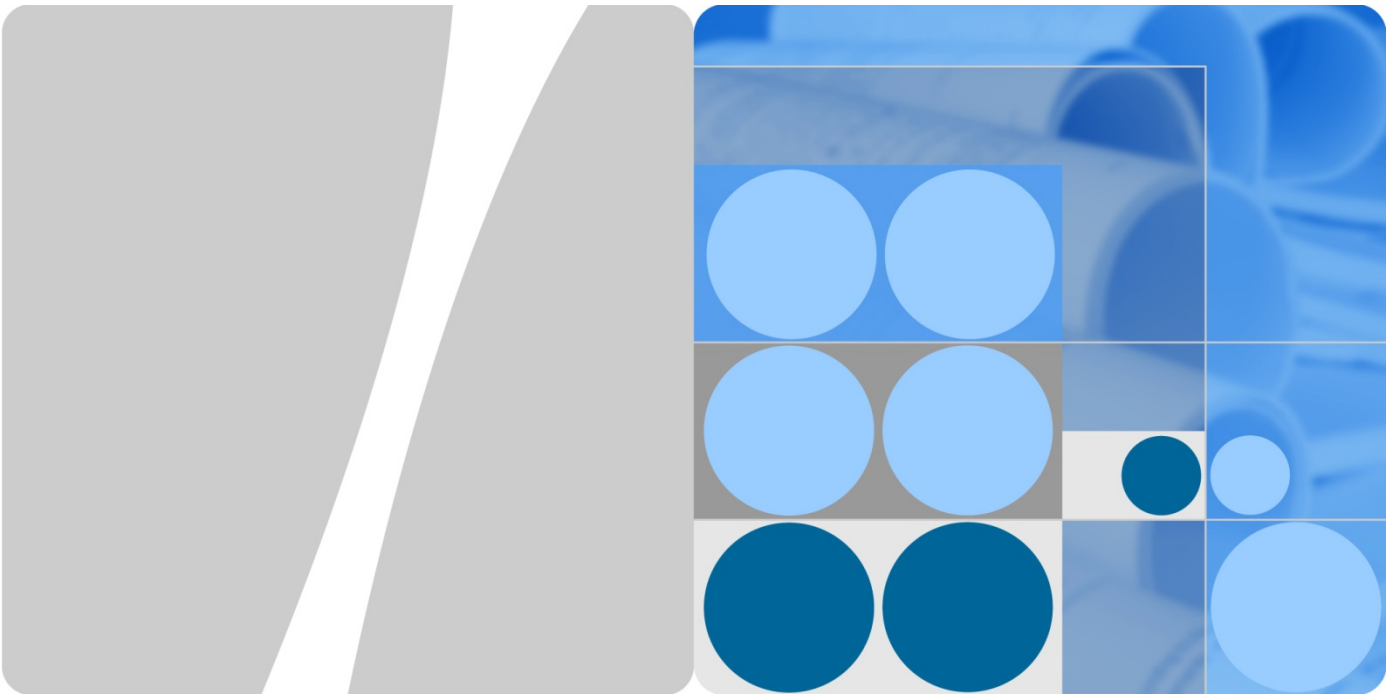

eCore
V100R018C50
Product Overview

Issue	**01**
Date	**2017-12-28**

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About This Document

Purpose

This document briefly describes the eCore product of V100R018C50, involving product positioning, product characteristics, services and functions, product structure, interfaces and protocol compliance, solution application scenarios, and technical specifications.

Intended Audience

This document is intended for:

- Sales personnel
- Customers

Change History

Issue	Date	Description
V1.0	2017-08-25	First release.
V1.1	2017-09-12	Update
V1.2	2017-12-28	Update

Contents

1 Overview

1.1 Background

LTE technologies have won overwhelming acknowledgement in the carrier market for their advantages of high data rate, low latency, packet transmission, and wide coverage. They have also been blended into applications across industries and newly established market segments. The telecommunications industry is being transformed and upgraded towards virtualization and cloudification. Network functions virtualization (NFV) has become much more mature, especially in the EPC field. Well-developed virtualization technologies can allow different software-based telecom NEs to be integrated into the same hardware device. Therefore, carriers can customize networks to meet various demands and quickly launch new services.

To meet the development trend of the market and technologies, Huawei launches the eCore solution. By using a virtualization platform, Huawei eCore solution can support a series of hardware and integrate multiple core network NEs. Flexible configurations are offered to meet different service requirements in different scenarios. Together with the eNodeB, terminals, and application servers, the eCore solution will unleash its great potential in market segments including the wISP, the mobile virtual network operator (MVNO), and Internet of Things (IoT), as well as in areas such as public safety, private industry networks, and enterprise applications.

1.2 Huawei eCore Solution

Figure 1-1 and Figure 1-2 show two types of networking of the eCore solution applied in pure broadband access and broadband trunking scenarios, respectively. With flexible deployment of different service NEs, the eCore solution can implement data access, video, trunking communications, and industry-related services. The eCore solution also supports interconnections with devices from other vendors.

Figure 1-1 Networking applied in the broadband trunking scenario

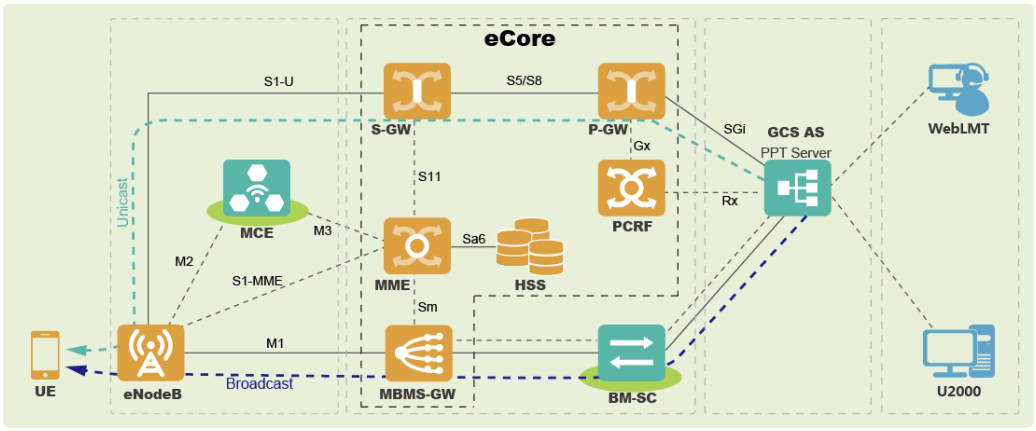
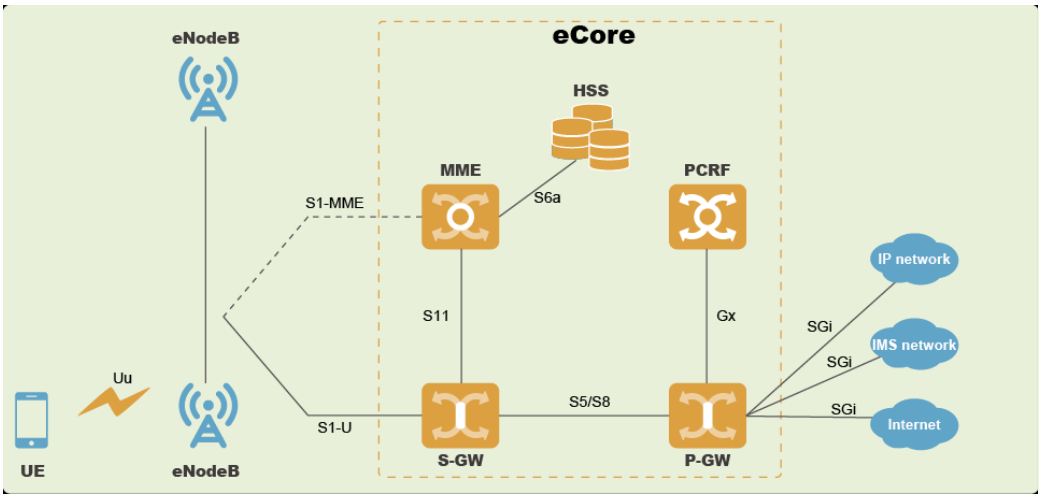


Figure 1-2 Networking applied in the pure broadband access scenario



eNodeB: LTE base station	S-GW: serving gateway	P-GW: PDN gateway
MME: mobility management entity	HSS: home subscriber server	PCRF: policy and charging rules function
MBMS-GW: MBMS gateway	U2000: network management system	

Service NE

eCore product series include the MME, EPC-UGW, HSS, PCRF, and other necessary service NEs. These NEs implement broadband access and trunking functions.

- MME

  The MME performs control-plane mobility management, including managing UE contexts and mobility and assigning temporary mobile subscriber identities. The MME

can be regarded as the controller of the LTE network for intra-system updates and handovers and inter-system interoperability.

- EPC-GW

  The EPC-GW includes the S-GW, P-GW, and MBMS-GW.

  The S-GW is a user-plane anchor for multiple access networks in 3GPP, and responsible for user-plane data exchange during UE movement between different access systems, screening interfaces of different access networks in 3GPP. The S-GW fulfills gateway functions of the EPC. It terminates interfaces towards the E-UTRAN.

  The P-GW is a user-plane anchor between the 3GPP access network and non-3GPP access network. The P-GW connects to the external PDN servers and fulfills gateway functions of the EPC. It terminates the SGi interface connected to the PDN server. A UE can access multiple PDN services through different P-GWs.

  The Multimedia Broadcast Multicast Service Gateway (MBMS-GW) is responsible for transmitting MBMS session control messages to the MME, and forwarding MBMS data to the eNodeB. The MBMS-GW can be co-deployed with the P-GW.

- HSS

  The HSS, like the HLR in GSM/UMTS networks, stores all service-related data of LTE subscribers. It manages subscription data and subscriber location information. Carriers run profit-making organizations, and only subscribed or authorized users can use their networks. The information about the subscription and authentication is stored on the HSS.

- PCRF

  The PCRF implements dynamic QoS policies and dynamic flow-based charging. It also provides authorization control based on subscribers' subscription information. The P-GW identifies service data flows and notifies the PCRF. The PCRF then delivers the specifications to determine whether the service is allowed and provides the QoS for the service.

1.3 Product Models

eCore product series are categorized into the following two types based on the hardware platform:

- Product based on OSTA5.0 (3U) is named: eCore9300.
- Product based on OSTA5.0 (1U) is named: eCore9100.

1.4 Product Positioning

eCore product series are deployed on the compact hardware platform. Different NE combinations are available for flexible deployment. They support abundant services related to enterprise applications and private industry networks through interconnections with peripheral devices. The services include P2P voice calls, P2P video calls, and trunking calls.

eCore product series can provide various value-added services and customized supplementary services to meet requirements of enterprise or industry customers, and will unleash its great potential in market segments including the wISP, the MVNO, and IoT, as well as in areas such as public safety, private industry networks, and enterprise applications.

2 Characteristics

This chapter mainly describes the eCore product series that feature simple hardware, low power consumption, easy deployment, and rapid delivery.

2.1 Advanced Platform Architecture

2.1.1 Advanced Hardware Platform

The eCore product series adopt Huawei NFV standard architecture, unifying NEs, such as the MME, EPC-GW, HSS, and PCRF, as the service layer. The OSTA5.0 (3 U/1 U) is used as the infrastructure, meeting reliability requirements for customers' large-capacity services. The OSTA5.0 is space-saving and easy to deploy. It can be deployed together with other core network devices in a subrack.

2.1.2 High Integration

eCore product series feature high integration and meet centralized management requirements. They have the following advantages:

- Reducing costs in device maintenance and maintenance manpower
- Simplifying the network by reducing the number of NEs
- Reducing power consumption and rent

2.2 High-Quality Service Experience

The eCore product provides high-quality service experience, involving high reliability, flexible deployment, efficient O&M, and diversified industry or enterprise services.

2.2.1 High Reliability

Table 2-1 lists specific measures taken in the eCore product for enhancing the system reliability.

Table 2-1 Measures for enhancing the system reliability

Item	Measure
Carrier-class hardware platform (OSTA5.0 3 U)	• The subrack devices can work in 1+1 backup mode. • Any board fault or replacement does not affect services. Service boards work in load-sharing mode and N+1 backup mode. Switch boards work in 1+1 backup mode. • Any subrack component fault or replacement does not affect services. Power entry modules (PEMs) work in 1+1 backup mode. A short-term failure of a single fan module or fan is tolerated. • In-depth fault detection and error correction are supported, ensuring a low failure rate and the availability of 99.999%.
Hardened open-source software platform	• Kernel-based Virtual Machine (KVM) has been certified as virtualization software. • Certification for SUSE Linux, Redhat Linux, and Windows is supported. The OSs are open-source, hardened, and stable.
Software redundancy backup	The VM works in N+M backup mode. When there are multiple boards, the VMs are deployed based on the anti-affinity policy. Any VM or board fault does not affect services.

2.2.2 Flexible Deployment

Huawei eCore product series support different NE combinations and implement flexible deployment according to application scenarios and customer requirements. The following provides an example:

- In the field of public safety, broadband trunking is a key service. eCore product series can work with the external PTT server and with the MME, EPC-GW, HSS, and PCRF. Together with LTE eNodeBs, eCore product series provide E2E broadband voice and video trunking services. The EPC-GW incorporates functions of the S-GW, P-GW, and MBMS-GW. eCore product series provide eMBMS-based 3GPP trunking communication services. (eMBMS is short for evolved multimedia broadcast/multicast service.)
- In services of the wISP enterprise market segment, the eCore system integrates the MME and EPC-GW.
- In the MVNO service in the gateway core network (GWCN) architecture, eCore product series provide an independent gateway for MVNO carriers to develop content-related services based on the gateway.

2.2.3 Efficient O&M

Pre-installation

All the software has been preinstalled before factory delivery, including the OS, VMs, platform software, service software, and management software.

Default networking

The interfaces and IP addresses for the interconnection between VNFs are allocated and configured after the VNFs are installed. Internal interfaces of service VNFs, such as S6a, are written based on the planned addresses.

Easy Maintenance

- All the configuration data is saved to hard disks and is accessible after power-on.
- Fast startup is supported. After a restart due to a fault, services are immediately restored.
- Fault management is supported, including alarms, tracing, system logs, and operation logs.

Multiple Management Modes

Both the U2000 and eSight are supported. Users can implement centralized management and O&M of the eCore system through the U2000 in carriers' or enterprises' equipment rooms or through the portable PCs running the Web LMT clients.

If the carrier has deployed the U2000, you are advised to connect the eCore system to the U2000 to implement centralized O&M management.

If there are a small number of eCore devices, O&M through the eSight is recommended.

If there are a large number of eCore devices, centralized O&M management through the U2000 is recommended.

2.2.4 Diversified Services

Huawei eCore product series can provide multiple solutions based on different customer requirements.

Wireless Broadband Solution for Enterprises

Carriers set up private LTE and EPC networks for enterprises, and provide services to both enterprise terminals and individual terminals. In this case, local traffic steering and user management policies are required. Enterprises implement functions such as security policies, local content push, and access management through management of local gateways.

Local Service Backup Solution

With the development of the manufacturing, transportation, energy, and related industries, informatization for them puts forward new challenges on dedicated radio networks for enterprises on the premise of efficiency and security. Demands for big data services based on high bandwidth are increasing in industry communications. Single voice services are evolving towards converged dispatch with voice trunking, broadband data, and video applications. Users have higher requirements for system capacity and lower tolerance for transmission delays. Carriers deploy private core networks (eCore) as the backup of the macro network, providing enterprise users with high-reliability services. The solution is suitable for remote areas where the transmission is unstable or the enterprises which have special requirements on reliability.

wISP Solution

The wISP is the supplement to the fixed broadband network. A dedicated core network can be deployed quickly using eCore product series to meet the requirements of multiple-NE integration, low costs, and physical isolation.

MVNO Solution

Huawei MVNO eCore solution provides high-throughput compact devices which integrate the P-GW. MVNO customers can choose different versions and customize different features as required, such as whether to use content parsing, whether to implement video optimization, and whether to deploy the near-end content server. eCore product series provide independent gateways. MVNO customers have high flexibility to provide special services.

IoT Solution

New services using Narrowband Internet of Things (NB-IoT) such as intelligent meter reading (IMR) and intelligent parking differ greatly from the traditional data services in terminals, base stations, and core networks. The core network is optimized and customized according to the characteristics of new services. It is a good solution to set up a dedicated core network for IoT using the eCore system.

3 Services and Functions

The eCore product mainly provides group call and multicast services as well as industry services.

The following describes main services and functions of the eCore products:

- Trunking CS services

  Trunking services initiated by the dispatching console (DC) and terminals can be established. Voice trunking functions, such as group termination and floor request, initiated by the DC can be performed.

- Data services

  Data services with different data rates can be performed. Concurrent operations of PS services and group voice services (or P2P call services) can be implemented. Inter-cell and inter-eNodeB handovers for services and data service roaming can be implemented.

- eCore geographic redundancy

  Dual-eCore-system backup (that is, geographic redundancy) is supported. In this backup mode, when one eCore system becomes faulty, services carried on this system are interrupted. The other eCore system is started for rapid service restoration.

- PS pool

  The eCore system supports the PS pool disaster recovery function. In PS pool disaster recovery scenarios on the core network, two pieces of cabinets with the same specifications, each of which houses one eCore system, can be deployed to implement PS pool disaster recovery.

- User and group management

  User and group subscription information can be managed and synchronized with other NEs.

- Public services

  Registration at power-on and deregistration at power-off can be performed. Mobility for terminals in idle state can be managed. The tracking area update (TAU) procedures periodically initiated by terminals in idle state can be processed.

- NB-IoT access

  The eCore system integrates service NEs, such as the MME, EPC-GW, HSS, and PCRF, and supports functions on the NB-IoT core network.

- eMBMS function

  The eCore system integrates service NEs, such as the MME, EPC-GW, HSS, and PCRF, and supports eMBMS services.

- Networking

  The eCore system supports virtual local area networks (VLANs), configurations of IPv4 routes, and the star topology of eNodeBs.

- O&M

  O&M on the core network through the U2000, Web LMT, or eSight is supported. For example, boards can reset during device maintenance.

- Transmission services

  A maximum of 50 eNodeBs can be configured. The E2E channel delay for voice services can be reduced. Data can be forwarded when multiple eNodeBs are in the star topology.

- Transmission configuration
  - Configurations of network interface parameters are supported. For example, users can run related MML commands to set parameters for configuring the rate, duplex mode, and autonegotiation.
  - Configurations of VLAN parameters are supported. For example, users can run related MML commands to set the VLAN ID and priority.
  - Users are allowed to run related MML commands to configure, delete, and query IPv4 routes.

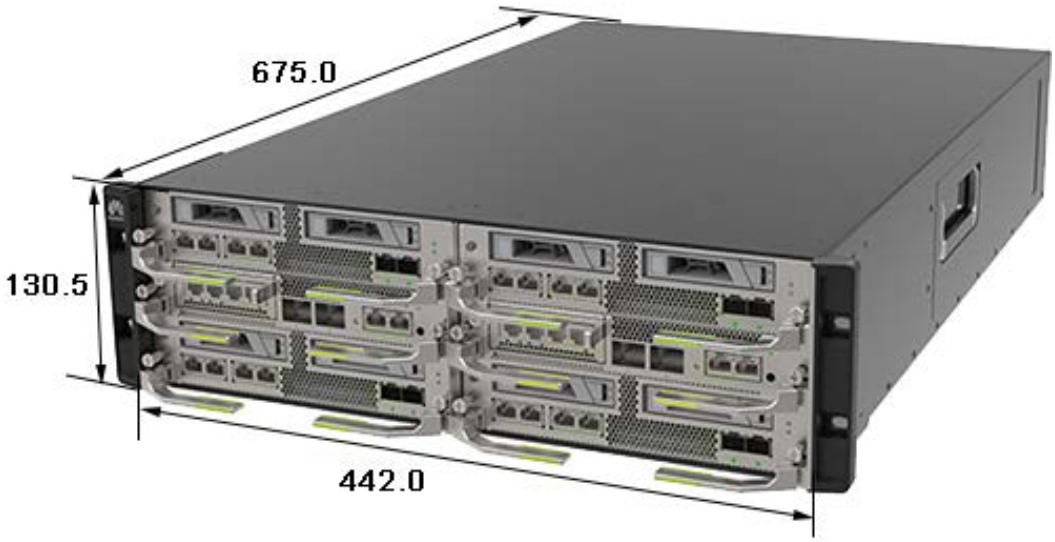
4 Architecture

This chapter describes the hardware architecture and software architecture of eCore product series.

4.1 Hardware Architecture

4.1.1 OSTA5.0 (3 U) Hardware Platform

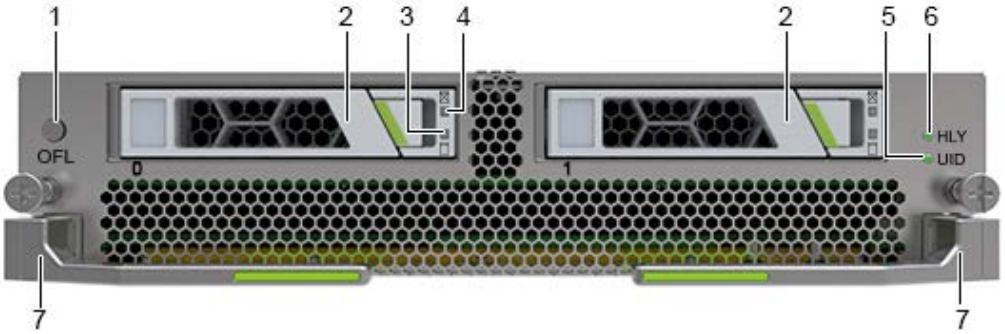
The eCore9300 uses Huawei OSTA5.0 (3 U) as the hardware platform. The following figure shows the exterior of OSTA5.0 (3U).



Component	Quantity	Description
PEM	2	DC and AC power is supported. Two PEMs are configured in 1+1 backup mode to prevent Single point of failures (SPOFs) in the power input. • Rated input voltage (DC): –48 V DC to –60 V DC • Rated input current (DC): 60 A per input • Rated power (DC): 2400 W (The rated power is 2400 W for each DC PEM.) • Rated input voltage (AC): 200 V AC to 240 V AC • Rated input current (AC): 10 A per input • Rated power (AC): 2000 W (The rated power is 2000 W for each AC PEM.)
Fan module	2	Two fan modules are configured to draw in cool air from the front of the subrack and exhaust warm air from the rear of the subrack. • Number of power inputs: 2 • Maximum power consumption: 90 W • Typical power consumption: 20 W
MSXA multi-function switch board	2	The MSXA multi-function switch boards implement operation, maintenance, and management of the system. Two MSXA boards are installed in slots 2 and 5 to work in active/standby mode. Each board provides two 1GE Base ports and two 40GE eFabric ports.
Service board GPUB9	4	GPUB9 boards are service processing units and are installed in slots 1, 3, 4, and 6. GPUB9 boards in any two of these slots can work in active/standby mode.

Figure 4-1 shows the exterior of the GPUB9 board in the OSTA5.0 (3 U). Table 4-1 lists functions of the GPUB9 board.

Figure 4-1 Exterior of the GPUB9 board



1 OFL indicator/button	2 Hard disk	3 Hard disk active indicator	4 Hard disk RAID/fault indicator
5 UID indicator	6. HLY indicator	7 Handle	

Table 4-1 Functions of the GPUB9 board

Function	Description
CPU	Uses two Intel® Broadwell-EP Xeon® E5-2600 v4 CPUs.
Memory	Provides eight DDR3 memory channels. The actual memory capacity is 128 GB.
Storage	Supports two 800 GB 2.5-inch SSD disks.
Internal switching	• Provides two 10GE Base ports for communicating with the Base plane of multi-function switch boards through the backplane. • Provides two 40GE Fabric ports for communicating with Fabric planes.

4.1.2 OSTA5.0 (1 U) Hardware Platform

The eCore9100 uses Huawei OSTA5.0 (1 U) as the hardware platform. The following figure shows the exterior of OSTA5.0 (1 U). The following tables describe the details.

Component	Description
OSTA5.0 (1 U)	The OSTA5.0 (1 U) supports DC and AC power. Two PEMs are configured in 1+1 backup mode to prevent SPOFs in the power input. • Rated input voltage (DC): –48 V DC to –60 V DC • Rated input current (DC): 15 A per input • Rated input voltage (AC): 100 V AC to 240 V AC • Rated input current (AC): 8 A per input • Maximum power consumption: 290 W • Typical power consumption: 240 W

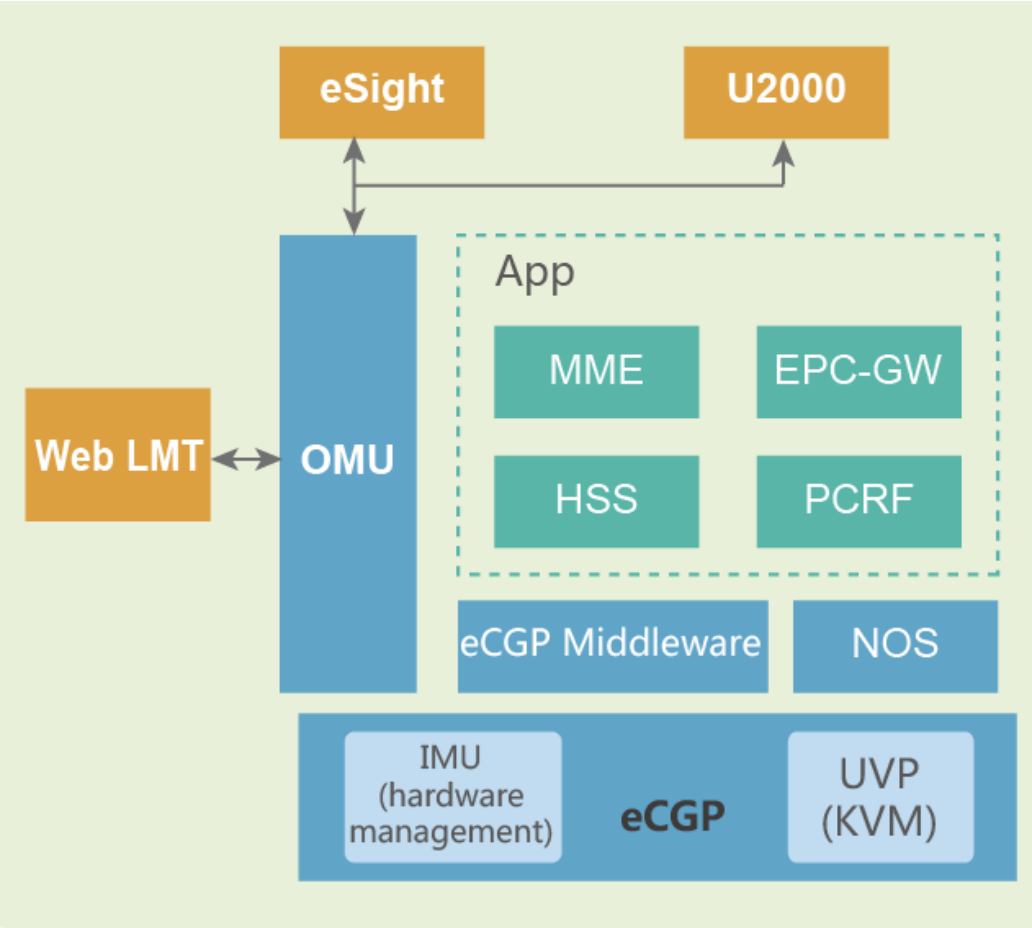
Function	Description
Computing and processing	Supports one or two Intel® Xeon® Ivy Bridge E5-2600 or Intel® Broadwell-EP Xeon® E5-2600 v4 CPUs.
Port	• The panel provides one external video graphics array (VGA) port that supports local display. • The panel provides two external USB 2.0 ports. • The panel provides two external 10GE enhanced small form-factor pluggable (SFP+) and two GE SFP optical ports, or provides four 10GE SFP+ optical ports. • The panel provides two external GE network ports. • The panel provides one external GE management network port.
Storage	Supports one or two 2.5-inch SSD or SAS disks.
Management	• Detects the temperature, voltage, and power, implements power control, manages hard disk hot swap, controls reset, and monitors the operating and health status. • Supports remote management. • Loads software online. • Manages the PEMs and fan modules.
Power supply	The panel provides two –48 V DC power input ports for DC power supply in 1+1 redundancy mode.

4.2 Software Architecture

4.2.1 Overall Software Architecture

The software system in the eCore consists of eCGP platform component software and service application software. Figure 4-2 shows the overall software architecture.

Figure 4-2 Overall software architecture



4.2.2 Host Software

The host software runs on boards in OSTA5.0 subracks. It provides the following functions: signaling access and processing, call processing, service control, and resource management. In response to specific commands executed by maintenance personnel, the host software also performs the following operations such as data management, device management, alarm management, performance measurement, signaling trace, and CDR management on the host in cooperation with the background software.

From bottom to top, the host software consists of the OS, middleware, and various types of application software.

OS

The host software uses the Linux real-time operating system (RTOS).

Middleware

The middleware technology (DOPRA_C) is used between the OS and application software, which ensures that the upper-layer service software is independent of the platform.

The middleware facilitates the migration of software functions among different platforms. Therefore, stable product versions are released quickly as the service software is rarely changed.

Service Application Software

The application software is the functional part of each NE in the eCore. Types of software with different functions are distributed on different process modules. Application software can be classified into the following:

- Signaling bearer software

  Implements the access of broadband and narrowband signaling and processing of the underlying protocols.
- Service processing software

  Performs signaling processing, call processing, mobility management, and resource management.
- Database software

  Manages switch data and dynamic subscriber data.
- System support software

  Implements system management and device interconnection.
- O&M software

  Receives the operation commands from the OMU and reports the command outputs to the OMU.

4.2.3 Background Software

The background software runs on the OMU and Web LMT. The background software provides the man-machine interface, which enables the maintenance personnel to implement the following functions, such as data management, device management, alarm management, performance measurement, signaling trace, CDR management, and interception management on the host in cooperation with the host software.

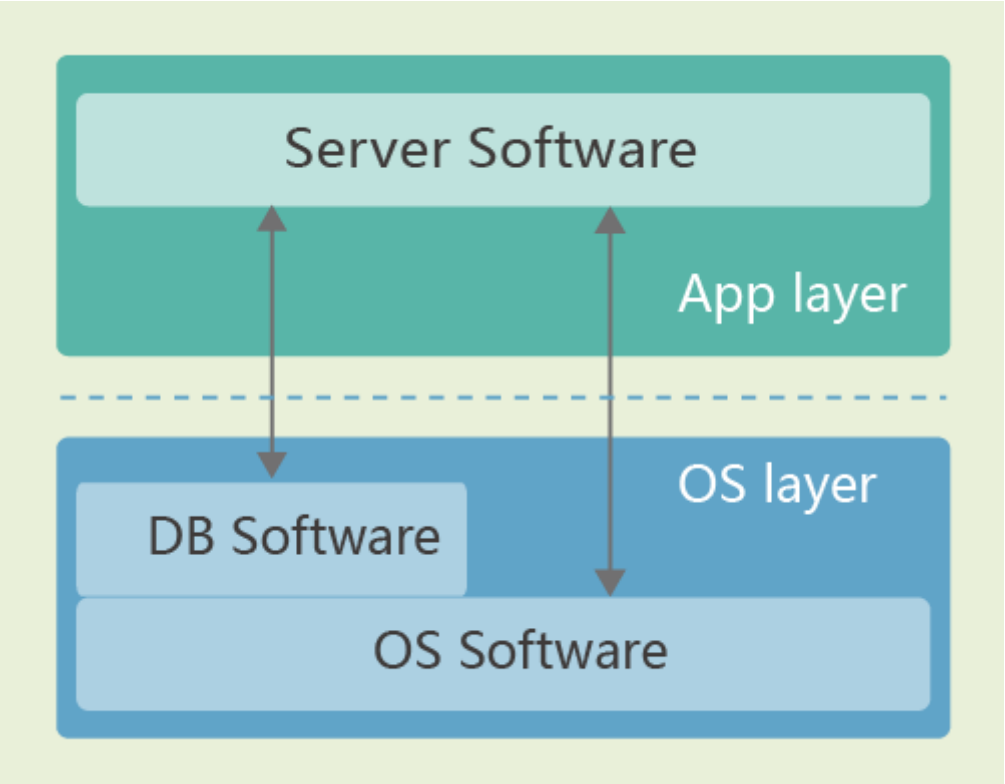
The background software adopts the client/server (C/S) model. It consists of the OMU server software and Web LMT software. The OMU server software is installed on an OMU board and functions as the server. The Web LMT software is installed on a workstation and functions as the client.

OMU Server Software

As a combination of the communication server and database server, the OMU server software forwards O&M commands from different workstations to the host and sends responses or command outputs of the host to the corresponding workstations. The OMU server software serves as the essential unit of the operation, administration and maintenance (OAM) software.

The OMU server software runs on the Linux OS. It uses several parallel service processes (such as the maintenance process, data management process, alarm process, and performance measurement process) to implement major functions of the OAM software. Figure 4-3 shows the relationship among the OMU server software, Linux, and database platform.

Figure 4-3 Relationship among the OMU server software, Linux, and database platform



Web LMT Software

The Web LMT software runs on the Windows OS of the PC hardware platform and is connected to the OMU as the client in C/S mode. The Web LMT software provides users with MML-based graphic terminals. The Web LMT can be used for local or remote maintenance. For example, the Web LMT allows dial-up access to the OMU server through the WAN.

Users can perform the following maintenance functions through the Web LMT: data maintenance, device management, alarm management, call and signaling trace, CDR management, and report generation.

5 Interface and Protocol Compliance

This chapter mainly describes physical ports and standard protocol-defined interfaces supported by the eCore product.

5.1 Physical Ports

Table 5-1 lists physical ports supported by the eCore product.

Table 5-1 Physical port specifications

Board	Description
MXU	The MXU board provides two 1GE Base ports and two 40GE eFabric ports.
GPUB9	The GPUB9 board provides two 10GE Base ports and two 40GE Fabric ports.

5.2 Protocol-defined Interfaces

The eCore product provides open and standard protocol-defined interfaces to interwork with various devices. The eCore product features powerful and flexible networking capabilities. Table 5-2 lists protocol-defined interfaces supported by the eCore product.

Table 5-2 Protocol-defined interfaces supported by the eCore product

Interface	Interface Protocol	Description
S1-MME	S1AP	Interface between the eNodeB and MME
S1-U	GTP-U	Interface between the eNodeB and S-GW
M3	M3AP	Interface between the MME and MCE

Interface	Interface Protocol	Description
SGi-mb	Diameter	Interface between the MBMS-GW and BM-SC
SGi	IP	Interface between the P-GW and PDN

6 Application Scenarios

This chapter mainly describes application scenarios of the eCore product.

6.1 Public Safety

In a globalized era for the LTE network architecture in new industries, government departments need to cooperate to allocate public resources and deliver joint commanding and dispatch to improve efficiency in urban public safety management. Administrative departments must be highly responsive to abrupt emergency situations for quick and accurate disaster relief. For this purpose, the eCore system is deployed to integrate multimedia communications, including video, voice, and data services, for government departments to perform joint dispatch, making right decisions and delivering effective commanding.

In the case of disasters such as earthquakes, fire, and tsunamis, local communication facilities may be seriously damaged or inaccessible due to network congestion caused by too many connections within a short period of time. The vehicle-mounted emergency communications system (containing the base station, eCore, and trunking server) can be quickly deployed to these areas for deployment. It allows communication among rescue personnel and provides trunking voice and video services to ensure smooth operation of the emergency command center. An emergency communications vehicle (ECV) provides an independent wireless broadband network and is a platform that integrates the responsive communication and information systems. The network on the ECV features high bandwidth and low delay. Being a private network, it is also safe and reliable and can be quickly established, facilitating onsite rescue, better understanding onsite conditions, improving the decision making efficiency, and protecting the safety and property of subscribers.

When service traffic increases sharply during large gatherings and major holidays, public communication facilities may be congested. The mobile private communication network on the ECV can ensure the smooth communication of the security personnel.

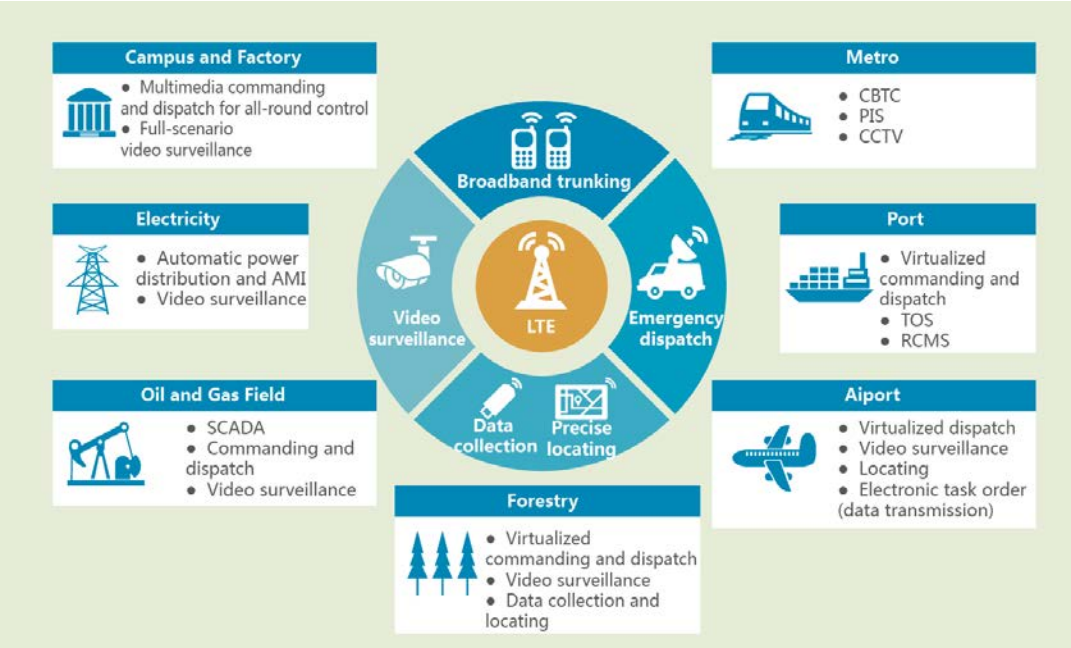
6.2 Private Industry Network

Industry, mining, public utilities, and transportation are basic and strategic industries for national economy and social development. Informatization construction of these industries requires an efficient wireless communication system (including the trunking call subsystem) across private industry networks. Featuring high responsiveness, reliability, and flexibility, it is frequently used in production, inspection, dispatch, firefighting, security, and engineering in

a range of scenarios including factories, campuses, mining areas, airports, and harbors. It also plays an important role in manufacturing dispatch and pipe maintenance, supplementing the wired dispatch system. In addition, wireless HD video surveillance, wireless sensors, and controllers have been increasingly popular.

The deployment of private industry networks does not require expensive carrier-class communication devices. As shown in Figure 6-1, the eCore system can provide rich wireless broadband services for private industry networks, together with different types of terminals, applications, and servers.

Figure 6-1 Industry application scenarios



6.3 Enterprise Applications

Enterprise Wireless Broadband

The current mainstream wireless broadband service for outdoor use is LTE, whereas that for indoor use is Wi-Fi. The development and maturity of LTE technologies have made LTE chips and terminals affordable and LTE indoor applications widely available. For large enterprises, carriers can help save the EPC backbone network bandwidth and the overall network traffic by deploying the micro eNodeB and enterprise-level EPC as well as adopting the mechanism of accessing local data through the local breakout (LBO) technology to achieve the shortest path. This will also improve user experience. The small- and medium-sized enterprises can outsource the wireless network facilities to carriers to trim costs of the IT department and improve reliability as well. This will ensure better indoor coverage and satisfy employees.

The B2C market of MBB business has been fully developed and is noted for intense competition. Mobile carriers are expected to expand their business scope to make more profits. At the same time, enterprise networks yearn for the combination of mobile services with cloud services to support more innovative services like bring your own device (BYOD),

NB-IoT, and opening pipe capabilities, and provide broadband access services as well as continuously innovate the enterprise business and provide better user experience.

Local Service Backup

The wireless base stations near such remote enterprises as refineries and mining areas are often far away from the core network equipment room deployed in big cities. The long communication distance across complicated environment can cause damage to optical fiber and cables. In this case, many important local information systems, such as push to talk (PTT) and video surveillance, will collapse. It will take a long time to locate and solve the problem, which seriously affects daily production.

Actually, if the core network is deployed within the enterprise, the PTT and video surveillance systems can also function properly even without communication with other devices within the macro network. Huawei eCore solution enables wireless base stations within the enterprise area to connect to both the EPC in the macro network (deployed in the carrier's equipment room) and the local eCore system which serves as a backup. When a communication failure occurs, the local eCore system can be started so that local services within the enterprise will not be compromised.

Because the local backup eCore and application servers (such as the PTT server and video surveillance server) are deployed in the equipment room of the enterprise, these core services for daily O&M can be easily provided through local transmission.

This solution enhances service reliability for enterprises in remote areas and avoids the negative impact of transmission failures caused by long-distance communication on daily O&M of these enterprises.

7 O&M

This chapter mainly describes O&M functions provided by the eCore.

7.1 Overview

The eCore system can be maintained by the U2000/Web LMT O&M client or network management system eSight.

The U2000 is used in public safety scenarios on trunking private networks. It maintains pipe devices such as the core network and base station.

In the enterprise wireless market, policies for network management are not very strict. The U2000 is used for O&M management on large-scale networks such as public safety and power networks, whereas the eSight is used for O&M management on small-scale networks such as those in campuses. The eSight integrates simple capabilities of network pipe devices (base station+core network) and management capabilities of the CPE, including device access, performance management, alarm management, topology management, NE management, and synchronization between configuration data and data obtained from the MML command client.

7.2 Characteristics

- User-friendly WebUI and simplified Web-based operations, improving user experience

  The eCore system can be maintained by the dedicated maintenance software eSight except for the U2000. The eSight software is easy to use, has powerful functions, and simplifies maintenance operations, improving user experience.
- Two access methods, diversifying O&M measures

  Local maintenance and remote maintenance are provided to adapt to different O&M scenarios.
- Powerful O&M functions for rapid fault location and troubleshooting

  By using the O&M tool, customers can obtain detailed product information, including the queried device status, data configuration, and status management.

  When emergency faults occur, boards can be reset for fault troubleshooting.
- Advanced software management function, implementing safe and smooth software upgrade

Remote upgrade can be implemented by using the O&M tool, and therefore operating personnel can upgrade the software in the O&M center, without affecting ongoing services. The O&M tool provides the function of backing up key system data during the remote upgrade. After an upgrade failure, the version can be rapidly rolled back, and the system can be recovered in a short period of time.

After the upgrade, the version consistency check function can be enabled to ensure version correctness.

- Convenient device installation, commissioning, and network upgrade solution, implementing rapid network deployment

  Before delivery, the eCore system has been configured with boards and common data and deployed with the OS, and is subject to strict assembly and tests. Hardware installation can be completed onsite only by cabinet fixation and cable connection. Then, software and data configuration files can be loaded to implement software and hardware commissioning. These operations are convenient, safe, and reliable.

- Stable safe operation mechanism, preventing misoperation

  The O&M tool is used to repeatedly confirm major operations through man-machine interaction, ensuring operation execution necessity and preventing service interruption caused by misoperation.

7.3 Security Management

The eCore O&M system is a multi-user system. It provides the following functions to ensure that multiple users can safely and conveniently perform operations in the O&M system:

- Rights management

  With this function, the operating personnel and maintenance consoles of the eCore system are assigned rights of different levels. In the eCore O&M system, users can run an MML command only after gaining both operating personnel rights and maintenance console rights.

- Log management

  With this function, users can query MML operation records. With the help of the operation logs, users can determine whether any operation that may adversely affect the system is performed.

8 Technical Specifications

This chapter mainly describes technical specifications of eCore product series.

8.1 System Capacity

Table 8-1 eCore9300 capacity specifications

Item	Value
Supported subscriber quantity	200000
Throughput	48Gbps（1024 bytes per packet）
eNodeB quantity	3000
eMBMS group quantity	4000

Table 8-2 eCore9100 capacity specifications

Item	Value
Supported subscriber quantity	10000
Throughput	5Gbps（1024 bytes per packet）
eNodeB quantity	100

8.2 Hardware Specifications

Table 8-3 Specifications of the eCore9300 (3 U)

Item		Specifications
Mechanical specifications	Dimensions (H x W x D)	130.5 mm x 442.0 mm x 675.0 mm
	Weight of an unloaded subrack	20.8 kg (configured with two fan modules and two PEMs)
	Weight of a fully loaded subrack	47.8 kg
DC power supply	Rated input voltage	-48–-60 V DC
	Maximum input voltage	-40–-72 V DC
	Rated power	2400 W (The rated power consumption of each DC PEM is 2400 W.) NOTE A subrack is configured with two PEMs working in 1+1 backup mode.
AC power supply	Rated input voltage	200–240 V AC
	Maximum input voltage	176–264 V AC
	Rated power	2000 W (The rated power consumption of each PEM is 2000 W.) NOTE A subrack is configured with two PEMs working in 1+1 backup mode.
Environmental specifications	Temperature	• Long-term working temperature: 0°C to 45°C (32°F to 113°F) • Short-term working temperature: –5°C to +55°C (23°F to 131°F) • Storage temperature: –40°C to +70°C (–40°F to +158°F)
	Humidity	• Long-term working humidity: 5% RH to 85% RH (non-condensing) • Short-term working humidity: 5% RH to 95% RH (non-condensing) • Storage humidity: 10% RH to 95% RH (non-condensing)
	Altitude	–60 m to +3000 m

Table 8-4 Specifications of the eCore9100 (1 U)

Item		Specifications
Mechanical specifications	Dimensions (H x W x D)	43.6 mm x 442.0 mm x 310.0 mm
	Subrack weight	7.1 kg
DC power supply	Rated input voltage	-48–-60 V DC
	Maximum input voltage	-40–-72 V DC
	Rated input current	15 A/input (two inputs supported)
AC power supply	Rated input voltage	100–240 V AC
	Maximum input voltage	90–290 V AC
	Rated input current	8 A (one input supported)
Environmental specifications	Temperature	• Long-term working temperature: 0°C to 45°C (32°F to 113°F) • Short-term working temperature: –5°C to +55°C (23°F to 131°F) • Storage temperature: –40°C to +70°C (–40°F to +158°F)
	Humidity	• Long-term working humidity: 5% RH to 85% RH (non-condensing) • Short-term working humidity: 5% RH to 95% RH (non-condensing) • Storage humidity: 10% RH to 95% RH (non-condensing)
	Altitude	≤ 4000 m

A Acronyms and Abbreviations

Numeric

3GPP	3rd Generation Partnership Project

A

ATCA	Advanced Telecom Computing Architecture

B

BYOD	Bring Your Own Device

E

eCore

eCGP	Evolved carrier grade platform
eMBMS	Evolved multimedia broadcast/multicast service
eNodeB	Evolved NodeB
eSight	Evolved Sight
ESS	Enterprise Service System
ETSI	European Telecommunications Standards Institute
EPC	Evolved Packet Core
EPC-GW	Evolved Packet Core Gateway

G

GWCN	gateway core network

H

HSS	home subscriber server
I	
IETF	Internet Engineering Task Force
IMS	IP Multimedia Subsystem
IoT	Internet of Things
IP	Internet Protocol
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
K	
KVM	Keyboard & Video & Mouse
L	
LBO	Local Break Out
LMT	Local Maintenance Terminal
LTE	Long Term Evolution
M	
MBMS-GW	Multimedia Broadcast Multicast Service Gateway
MME	mobility management entity
MML	Man Machine Language
MVNO	Mobile Virtual Network Operator
N	
NB-IoT	Narrowband Internet of Things
NFV	network functions virtualization
NTP	Network Time Protocol
O	
OAM	Operations Administration & Maintenance
O&M	Operation and Maintenance
OMU	operation and maintenance unit

OSTA	Open Standards Telecom Architecture
P	
PCRF	policy and charging rules function
PDN	packet data network
P-GW	PDN gateway
PLMN	Public Land Mobile Network
PSTN	Public Switched Telephone Network
PTT	Push-To-Talk
Q	
QoS	Quality of Service
S	
SFTP	Secure File Transfer Protocol
S-GW	serving gateway
SIP	Session Initiation Protocol
U	
UE	User Equipment
PCRF	Unified Policy and Charging Controller
W	
wISP	Wireless Internet Service Provider