HUAWEI iMaster NCE Data Sheet

iMaster NCE-FAN Lite

HUAWEI iMaster NCE is the industry's first network automation and intelligence platform that integrates management, control, analysis, and intelligent functions. It effectively connects physical networks with business intents and implements centralized management, control, and analysis of global networks. It enables resource cloudification, full-lifecycle network automation, and data analytics-driven intelligent closed-loop management according to business and service intents and provides open network APIs for rapid integration with IT systems. Mainly applied in data center, enterprise campus, enterprise private line, and carrier network scenarios, it accelerates service transformation and innovation for carriers and enterprises by improving the simplicity, intelligence, openness, and security of networks.

As the smart brain of the entire network, NCE effectively connects the physical network to the business intent. It has the following four key capabilities:

- All-cloud platform with ultra-large system capacity
- Full-lifecycle automation
- Intelligent closed-loop management based on big data and data analysis
- Scenario-based application ecosystem enabled by open programmability
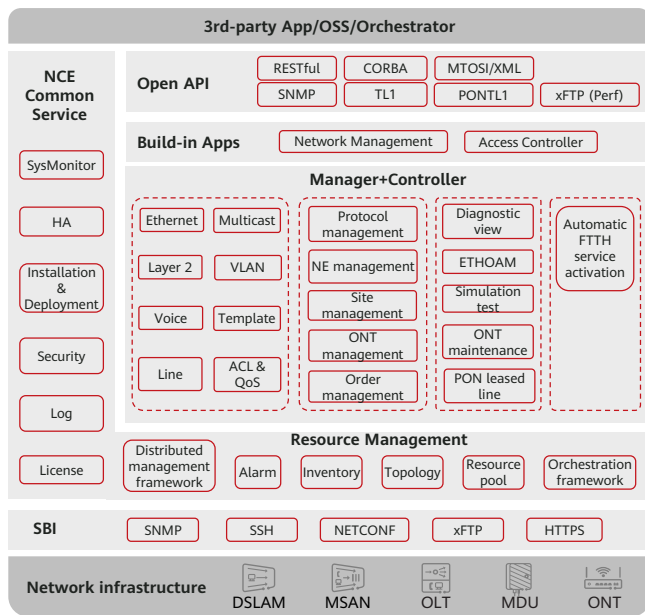
Product Description

With the advent of the all-optical network era and the next-generation passive optical network (NGPON), service providers are looking for innovative networks to prepare for the rapid traffic growth in the future. The software-defined networking (SDN) technologies are used to improve network agility for diversified new services. The network infrastructure must be ultra-broadband, simplified, open, agile, and intelligent, of which, the access network consists of optical network terminals (ONTs), multi-dwelling units (MDUs), and optical line terminals (OLTs). The access management and control O&M system simplifies network deployment, improves O&M automation, reduces network capital expenditure (CAPEX), and improves O&M efficiency.

NCE is an integrated platform for network management, control, and analysis. It provides NE and ONT connection management capabilities in the Access Manager and Controller scenario. Limited by carriers' business and O&M costs, it provides automatic network management processes and manages abstraction models of NE universal interfaces. This implements visualized management of legacy networks and NETCONF/YANG NEs and helps carriers simplify O&M, improve O&M efficiency, and reduce field visits.

Architecture and Key Components

Based on a cloud architecture, NCE utilizes service-based module design and supports distributed virtualization deployment. The overall architecture consists of modules such as common services, Manager+Controller, scenario-based apps, and southbound and northbound openness.

3rd-party App/OSS/Orchestrator		

NCE Common Service

Open API: RESTful · CORBA · MTOSI/XML · SNMP · TL1 · PONTL1 · xFTP (Perf)

Build-in Apps: Network Management · Access Controller

Manager+Controller
- Ethernet · Multicast · Layer 2 · VLAN · Voice · Template · Line · ACL & QoS
- Protocol management · NE management · Site management · ONT management · Order management
- Diagnostic view · ETHOAM · Simulation test · ONT maintenance · PON leased line
- Automatic FTTH service activation

Resource Management
- Distributed management framework · Alarm · Inventory · Topology · Resource pool · Orchestration framework

NCE Common Service side: SysMonitor · HA · Installation & Deployment · Security · Log · License

SBI: SNMP · SSH · NETCONF · xFTP · HTTPS

Network infrastructure: DSLAM · MSAN · OLT · MDU · ONT

Common service module: provides basic network services such as alarms and logs and product engineering capabilities such as disaster recovery (DR) and backup.

Manager+Controller: provides access network management and control services, including:

- Provisioning services on the access network, including provisioning Ethernet, multicast, and voice services, and managing VLANs, profiles, access control list (ACL) & quality of service (QoS), and lines corresponding to the services.
- Managing access devices, including the management of the central office (CO) devices and terminals such as the BITS, MSAN, DSLAM, OLT, and ONT, and managing the environment monitoring sites corresponding to the CO devices.
- Access network diagnosis and maintenance management, including FTTH service diagnosis views, circuit and loop line tests and emulation tests for access media, and remote ONT maintenance and management.
- Access network automation: automatic FTTH service activation.

Scenario-based app: provides network management and automatic access capabilities for different business scenarios.

Northbound and southbound openness: provides NBIs and SBIs for quick interconnection and integration with third-party applications and other management and control systems and devices.

Highlights

Service Automation
Automatic FTTH service activation: Service data is automatically configured, improving service configuration efficiency.

Capability Openness
Based on the unified open architecture of the controller, NCE provides standard RESTful NBI open network capability models to accelerate service innovation. NETCONF/YANG SBIs and legacy interfaces are supported, enabling network convergence management.

PON Leased Line O&M
PON leased line views can be customized.
Allows users to view the overall information of ONUs, and details and alarm details of any ONU in the view.

OLT Centralized Management
- Supports master frame resource management, topology visualization, and Layer 2 service configuration in the OLT centralized management system.
- Supports visualization, details query, and management of master frame site resources in the OLT centralized management system.

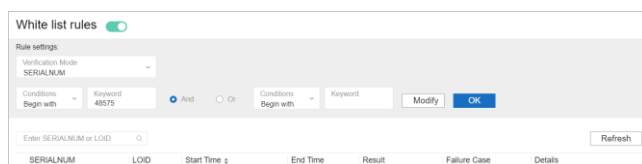# Key Features

ONU Access Network Deployment

ONU PnP Fast Deployment
NCE provides a PnP solution. You can configure the PnP policy on NCE, including allocating IP addresses, adding ONUs and management service channels, upgrading software, configuring scripts, and configuring ONUs, and then bind the policy to the related OLT. When an ONU goes online for the first time and reports traps to NCE, NCE automatically invokes the PnP policy and performs related operations defined in the policy to complete ONU PnP policy deployment. In this manner, the deployment efficiency is greatly improved and the network construction cost is lowered.

Automatic FTTH Service Activation

In the FTTH service automatic activation scenario, service data can be automatically and efficiently configured without using the OSS, which does not require any manual operations and improves the service configuration efficiency.

After a user configures an ONT whitelist and enables the ONT activation policy, NCE delivers the policy file to the ONT after it goes online and automatically activates ONT services based on the defined policy file.

NCE supports logical division of physical resources (such as devices, boards, and ports) to divide ONTs into regions. You can configure region information in the policy file so that different policies can be applied to different physical resources.

Intelligent FTTx Site Management

The intelligent site management solution can be used for FTTx sites. Sensor components are used to avert black-box management, remotely monitor site status in a visualized way, simplify door lock rights management, and remotely detect batteries. Site asset management, visualized site monitoring, and remote operations reduce the number of site visits, facilitate remote site maintenance, and save on maintenance costs.
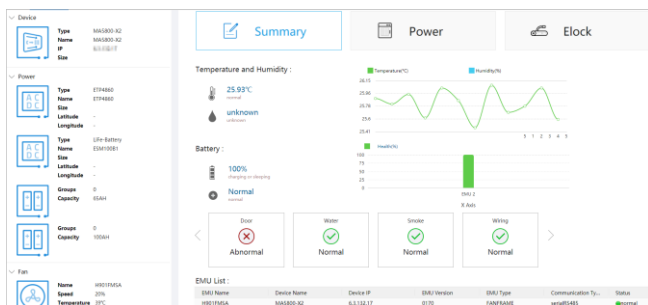
Remote Diagnosis

FTTC/FTTB diagnosis view: This view displays E2E links from CPE UNIs to OLT upstream ports to implement one-stop NE and link status monitoring and fault diagnosis. With this view, FTTC/FTTB troubleshooting is simplified.

FTTH diagnosis view: This view displays E2E links from ONT UNIs to OLT upstream ports to implement one-stop NE and link status monitoring and fault diagnosis. With this view, FTTH troubleshooting is simplified.

Remote emulation test: Maintenance personnel can remotely diagnose faults on voice, broadband, and other services.

Intelligent alarm analysis: Alarm compression, correlation analysis, and other methods are provided to reduce the alarm quantity and help users identify root causes.

NE data verification: NE configuration data is verified against the data planned by carriers to avoid data inconsistency and the resultant service problems.

ONT video quality diagnosis: Faults of IPTV + cooperated OTT videos can be quickly diagnosed and demarcated. NCE collects quality indicators in real time, displays them in a visualized manner, and compares them to quickly demarcate faults.

Northbound and Southbound Openness

NCE supports the new RESTful NBI and traditional NBIs such as XML, CORBA, and SNMP for compatibility with new and existing evolvable networks. It covers all scenarios such as network performance monitoring, automatic service configuration, and network monitoring. The NBIs provide various atomic APIs and scenario-based APIs, greatly simplifying the integration of the northbound OSS/IT system and shortening the TTM. The unified API gateway provides a secure and reliable entry point for access.

Open API

Displays NCE NBI capabilities through open APIs and provides tool suites to meet customized API development requirements.
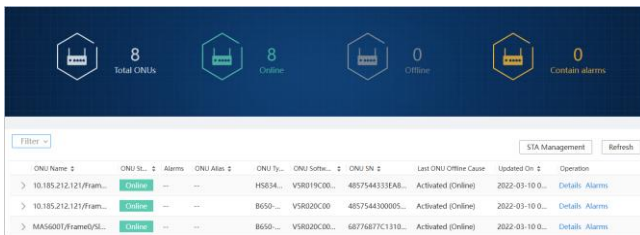
API Catalog

Provides the capability of exporting NCE NBI categories, interface documents, and supports search for APIs by keyword.

PON Leased Line O&M

You can customize a PON private line view by configuring the ONU type, ONU name matching rule, and ONU name keyword.

After the configuration is complete, you can view the overall information about ONUs (including the total number of ONUs, number of online ONUs, number of offline ONUs, and number of ONUs that contain alarms) in the PON private line view. In addition, you can view the details and alarm details of any ONU in the view.


OLT Centralized Management

The master OLT with complex functions is deployed in the central office (CO) equipment room, and the functions of the remote slave OLT are simplified, so that device management and deployment are simplified. NCE can manage all OLTs on the entire network by managing only the master OLT, which greatly reduces service management and maintenance costs.
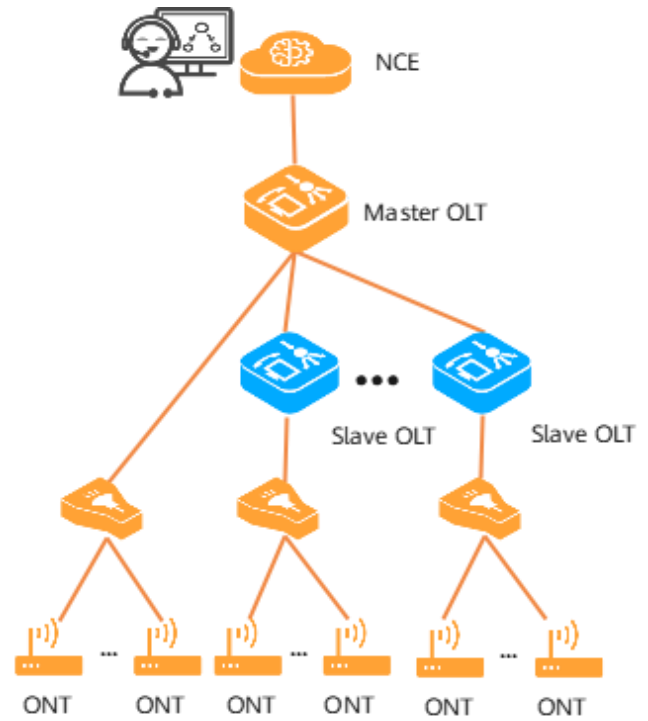
Scenario-based App

Network Management

NCE supports the following series of access NEs: FTTx, DSLAM, MSAN, BITS, EDFA, and RPS. It realizes PnP fast deployment and E2E visible fault diagnosis.
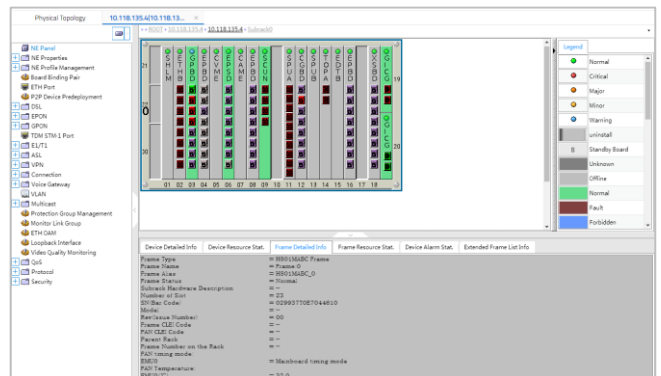
Specifications

Category	Description
Management and control of NEs	Basic network configuration and access service provisioning
Simplified access device installation and PnP	ONU ZTP Service provisioning Automatic recovery of ONU after replacement
Automatic FTTH service activation	No OSS required Automatic ONT service activation
E2E diagnosis and remote repair	E2E diagnosis view Remote emulation test Video quality diagnosis

Operating Environment

On-Premises Deployment

Hardware Configuration Requirements of TaiShan 200 (Model 2280)

Hardware	Model	Requirement
128 GB server	TaiShan 200 (Model 2280) (compatible)	CPU: 2 x Kunpeng 920 (2.6 GHz, 32 cores) RAM: 4 x 32 GB DDR4 Hard disk: 8 x 1200 GB HDD or 2 x 1920 GB SSD RAID controller card: MegaRAID 9560-8i (4 GB cache), Avago 3508 (2 GB cache), or PMC 3152 (2 GB cache) NICs: 2 x 4 GE electrical ports

TaiShan Servers Required

Service Scenario	Network Scale	Hardware	Number of Servers
Manager+Controller	< 1,000 equivalent NEs	128 GB server	1

Hardware Configuration Requirements of 2288X V5

Hardware	Model	Requirement
128 GB server	2288X V5	• CPU: 2 x Xeon Silver 4210 (2.2 GHz, 10 cores) • RAM: 4 x 32 GB DDR4 • Hard disks: 8 x 600 GB SAS HDD or 2 x 1920 GB SSD • RAID controller card: MegaRAID 9560-8i (4 GB cache) delivered, compatible with Avago 3508 (2 GB cache) and PMC3152 (2 GB cache) • NICs: 4 x 2 GE electrical ports delivered, compatible with 2 x 4 GE electrical ports

2288X V5 Servers Required

Service Scenario	Network Scale	Hardware	Number of Servers
Manager+Controller	< 1,000 equivalent NEs	128 GB server	1

Hardware Configuration Requirements of RS221G1

Hardware	Model	Requirement
128 GB server	RS221G1	• CPU: 2 x Xeon Silver 4210 (2.2 GHz, 10 cores) • RAM: 4 x 32 GB DDR4 • Hard disks: 8 x 600 GB SAS HDD • RAID controller card: Avago 3508 (2 GB cache) delivered, compatible with PMC3152 (2 GB cache) • NICs: 4 x 2 GE electrical ports + 2 x 2 10GE optical ports delivered

RS221G1 Servers Required

Service Scenario	Network Scale	Hardware	Number of Servers
Manager+Controller	< 1,000 equivalent NEs	128 GB server	1

Resource Configurations

VM resources required for private cloud deployment

Service Scenario	Network Scale	VMs	vCPUs	RAM (GB)	Storage (GB)	Recommended IOPS	Read Delay (ms)	Write Delay (ms)	I/O Block Size (KB)	Read/Write Ratio
Manager	< 1,000 equivalent NEs	1	16	64	500	1000	8	5	16	2:8

Hardware resources required for physical machine deployment (SUSE, for Product Only)

Service Scenario	Network Scale	CPUs	RAM (GB)	Storage (GB)	NIC	Recommended IOPS	Read Delay (ms)	Write Delay (ms)	I/O Block Size (KB)	Read/Write Ratio
Manager	< 1,000 equivalent NEs	2.2 GHz, 16 cores	64	Customer-provided SUSE OS: 550	1 x 4 GE	1000	8	5	16	2:8
Manager+ Controller	< 1,000 equivalent NEs	2.2 GHz, 40 cores	128	Customer-provided SUSE OS: 1200	1 x 4 GE	1000	8	5	16	2:8

Software Configuration Requirements

Item	Type	Version	Remarks
Delivered software	OS	EulerOS V200R012 (EulerOS 2.12)	Used on the Arm server in the on-premises scenario and in the private cloud scenario. Used on the x86 server in the on-premises scenario and in the private cloud scenario.
	Database	GaussDB T V3 (also called Gauss100 OLTP 1.9.1)	Used by the Manager to store manager data.
Compatible software	OS	EulerOS V200R009 (EulerOS 2.9) EulerOS V200R010 (EulerOS 2.10) EulerOS V200R011 (EulerOS 2.11)	-
		EulerOS V200R012 (EulerOS 2.12)	Used on the x86 server in the on-premises scenario and in the private cloud scenario.
Compatible software (x86, SUSE)	OS	Customer provided: SUSE Linux Enterprise Server 12 SP5 Customer provided: SUSE Linux Enterprise Server 15 SP6	Used in the scenario where SUSE OS is compatible.
	Database	GaussDB T V3 (also called Gauss100 OLTP 1.9.1)	Used to store NCE product data.