



iMaster NCE-Campus Product Brochure



HUAWEI

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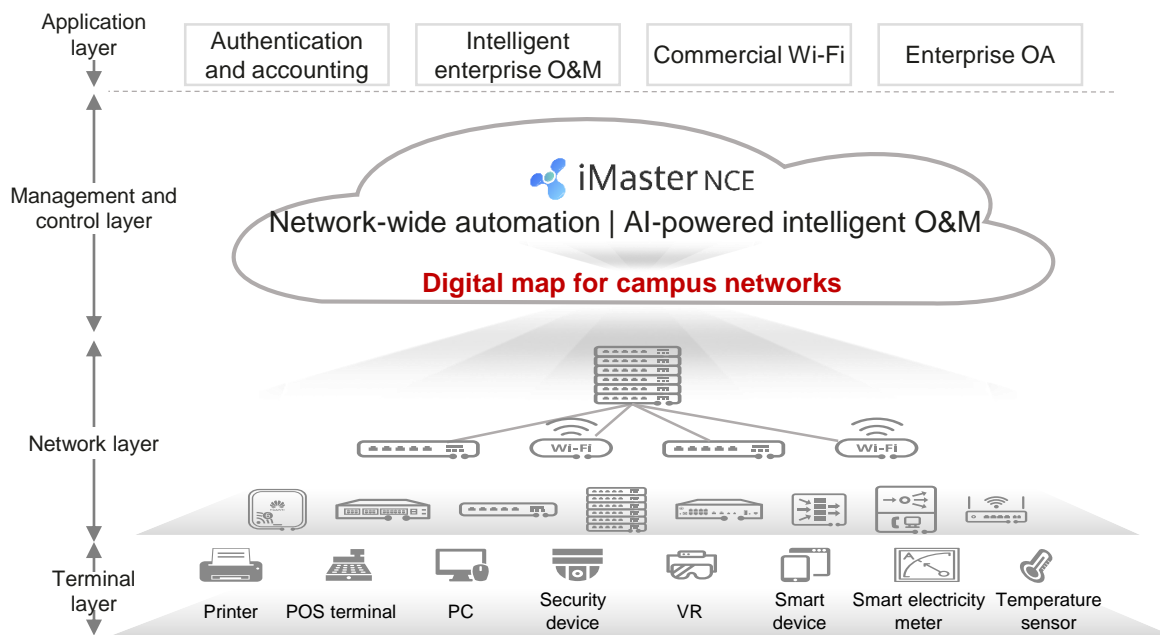
Product Overview

iMaster NCE-Campus — Huawei's next-generation autonomous driving network management and control system for campus networks — integrates management, control and analysis functions, providing full-lifecycle automation of campus networks. Intelligent fault closure is also implemented through network digital maps, big data analytics. Helping enterprises reduce both Operating Expenditure (OPEX) and Operations and Maintenance (O&M) costs, iMaster NCE-Campus accelerates enterprise cloudification and digital transformation by achieving automated and intelligent network management.

Solution Description

With the rapid development of enterprise services and comprehensive digital transformation of campus networks, campus networks are rapidly developing towards wireless, cloudification, and intelligence. In this trend, a large number of innovative services such as bring your own device (BYOD), IoT, cloud UC, cloud office, VR, AR, and live streaming are emerging, a vast number of terminals are accessing the network, the network scale is growing exponentially, and various digital services frequently go online or are adjusted. However, the number of network administrators does not increase. If the administrators still manage networks using CLIs and scripts, networks will inevitably become a bottleneck for rapid service innovation and an obstacle for enterprise digitization. As the automatic management center of campus and branch networks, iMaster NCE-Campus is faced with multiple opportunities and challenges: how to accelerate network service deployment, how to provide reliable Service Level Agreement (SLA) guarantee, and finally how to improve user experience. In campus and branch network scenarios, iMaster NCE-Campus uses cloud computing, SDN, and big data analytics to implement automatic and centralized network management, provide data collection and analysis capabilities (not supported in traditional solutions), and perform centralized control over access rights, QoS, bandwidth, application, and security policies of campus users. The controller also enables service-driven virtual service provisioning in a simplified, rapid, and intelligent mode, and leverages big data analytics to provide intelligent O&M capabilities, such as real-time experience visibility and intelligent fault prediction, enabling networks to provide automated and intelligent services.





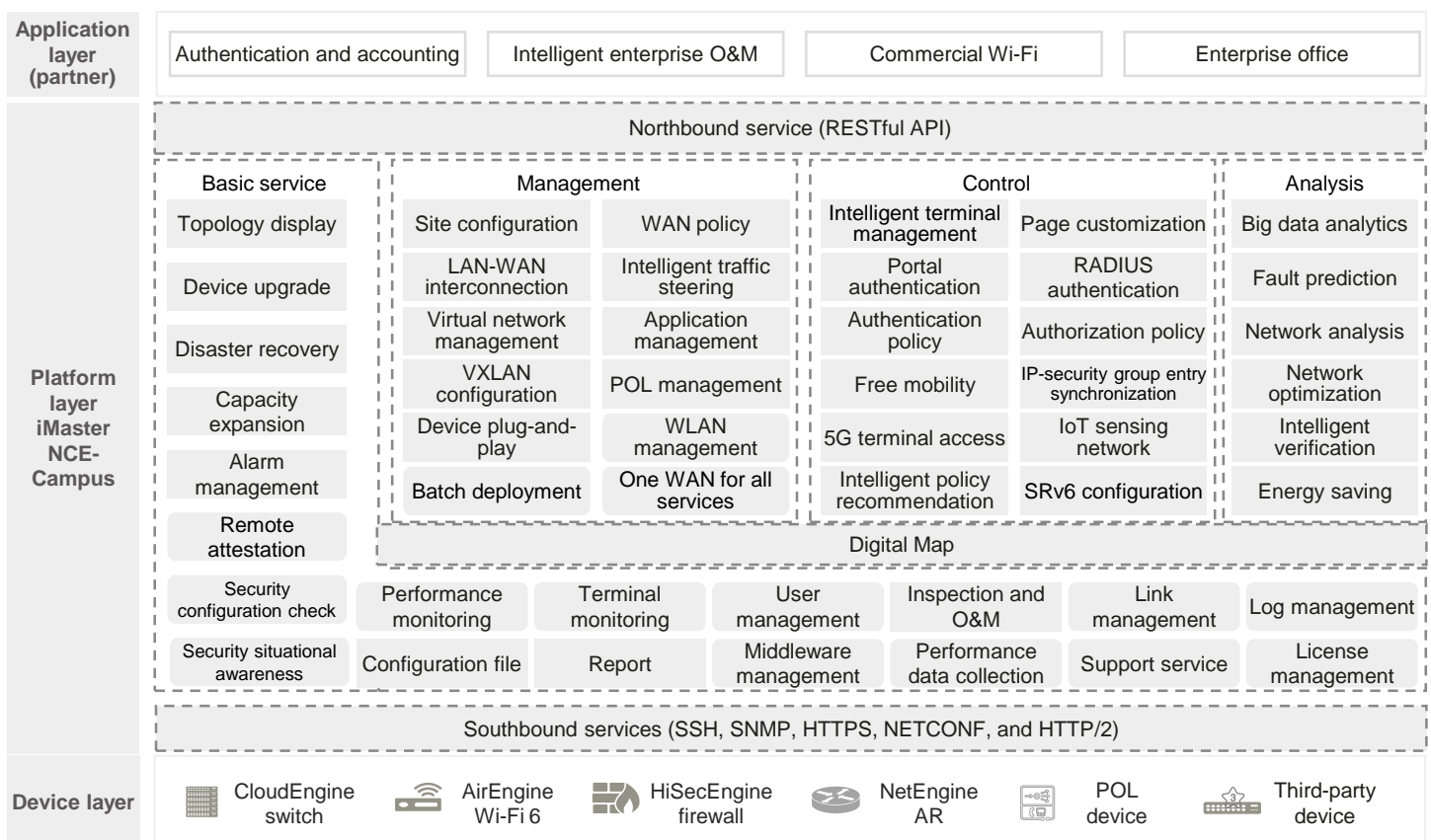
Note: Intelligent O&M requires iMaster NCE-CampusInsight.

As the intelligent management and O&M center of campus networks, iMaster NCE-Campus covers large- and medium-sized campus networks, small- and midsized-business (SMB) networks, multi-branch interconnection networks, and IP+POL device convergence networks. It has the following key capabilities:

- **Network deployment automation:** network deployment automation, virtual network service provisioning automation, LAN-WAN multi-branch interconnection automation, and WAN interconnection automation.
- **Service policy automation:** massive user authentication, intelligent terminal management, 5G terminal access, IoT awareness network, multi-level QoS hierarchical scheduling, hierarchical templates, and intelligent verification.
- **Intelligent O&M:** One-map visualization, application assurance, VIP experience assurance, fault prediction, one-click optimization, intelligent policy recommendation and energy saving.

Architecture and Key Components/Key Components

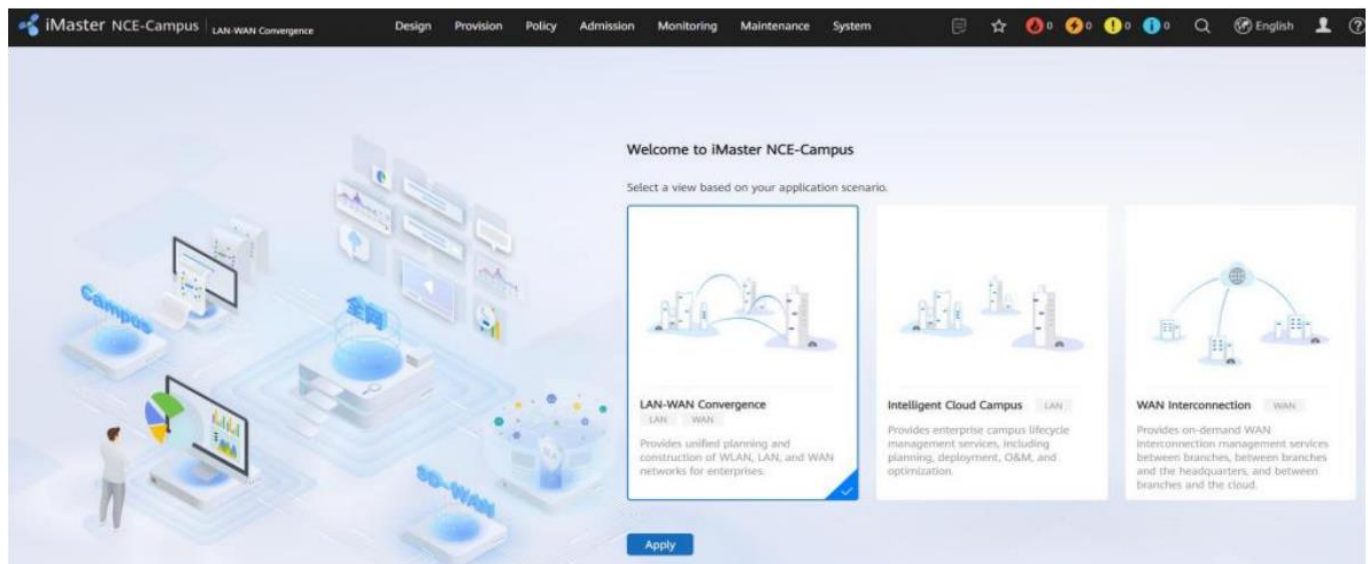
Based on the cloud computing and distributed architecture design, iMaster NCE-Campus adopts the service-oriented modular design and supports distributed deployment. The overall architecture consists of four components: basic services, management, control, and analysis.



Highlights/Benefits

Network Deployment Automation

Provides various deployment modes, such as code scanning-free remote deployment, barcode scanning-based deployment via a mobile app, DHCP-based deployment, deployment through the registration query center, and ZTP-based deployment of POL devices. In this way, devices are plug-and-play and networks are provisioned within minutes, greatly simplifying network deployment and shortening the construction period. Deploys VXLAN networks in an E2E mode. This implements service isolation, one network for multiple purposes, and a wide range of networking models (such as centralized gateway and distributed gateway), enabling more flexible and efficient network adjustment and capacity expansion. Performs E2E unified deployment, management, and monitoring for LAN and WAN network devices in multi-branch interconnection scenarios. This guarantees E2E services, reduces O&M costs and improves O&M efficiency. Manages campus, WAN access, and backbone networks in a unified mode. Based on SRv6 technology, WAN network path navigation is implemented, maximizing network resource utilization.



Business Policy Automation

Manages a large number of network devices and supports multiple access modes, such as 802.1x authentication, Portal authentication, and social media authentication. Users and IP addresses are decoupled to access the network anytime and anywhere, with consistent rights, achieving free mobility and user experience, and meeting permission control requirements. Effectively ensure user experience.

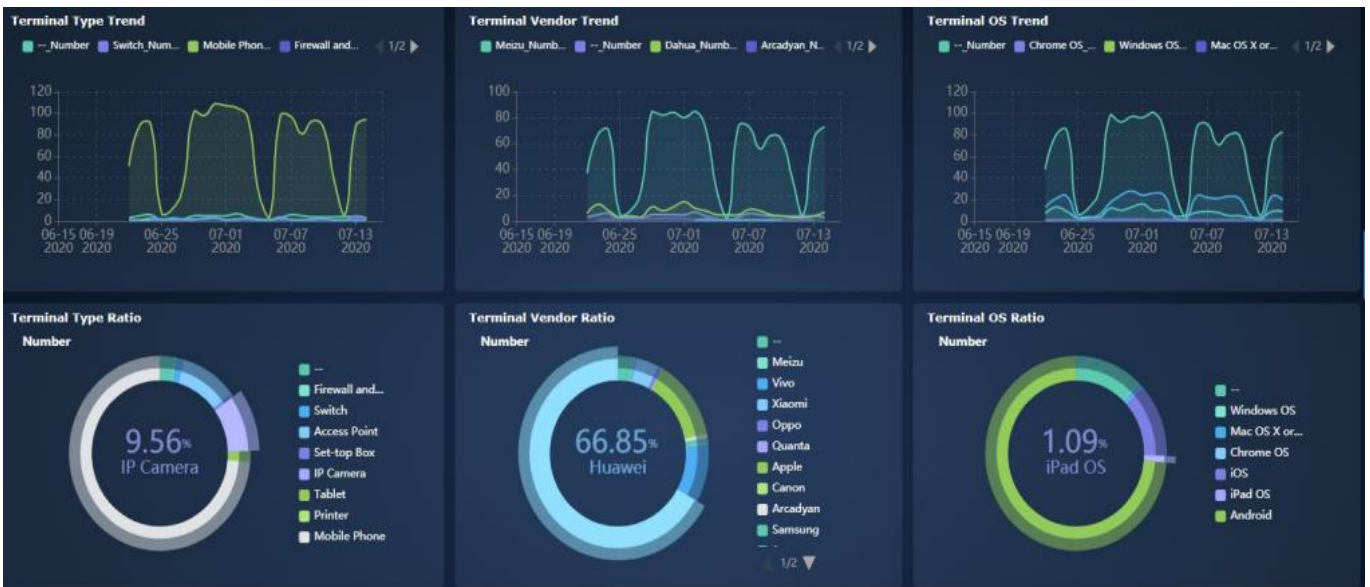
The built-in terminal fingerprint library greatly improves the accuracy of terminal type identification by intelligent identification and comprehensive use of multiple identification methods. Identifies 100% of the cameras, IP phones, printers, and fax machines of top 5 vendors.

A large number of IoT terminals can access the network intelligently, and policies can be automatically matched and delivered. IoT terminals are plug and play. Continuous training on the cloud and local download deployment is used to expand the terminal identification fingerprint database infinitely.

Hierarchical templates are used to improve the efficiency of delivering similar configurations to multiple branches and implement quick batch delivery of deployment and modification.

After the network segment and configuration are changed due to new services or changes, the intelligent verification function is used to test the network segment and configuration, ensuring that no error occurs during the network change.

In addition, the provides multi-level QoS hierarchical scheduling based on user and service priorities, implementing different policies for different users and applications. In addition, the bandwidth policy management and control are more refined, ensuring user access experience.



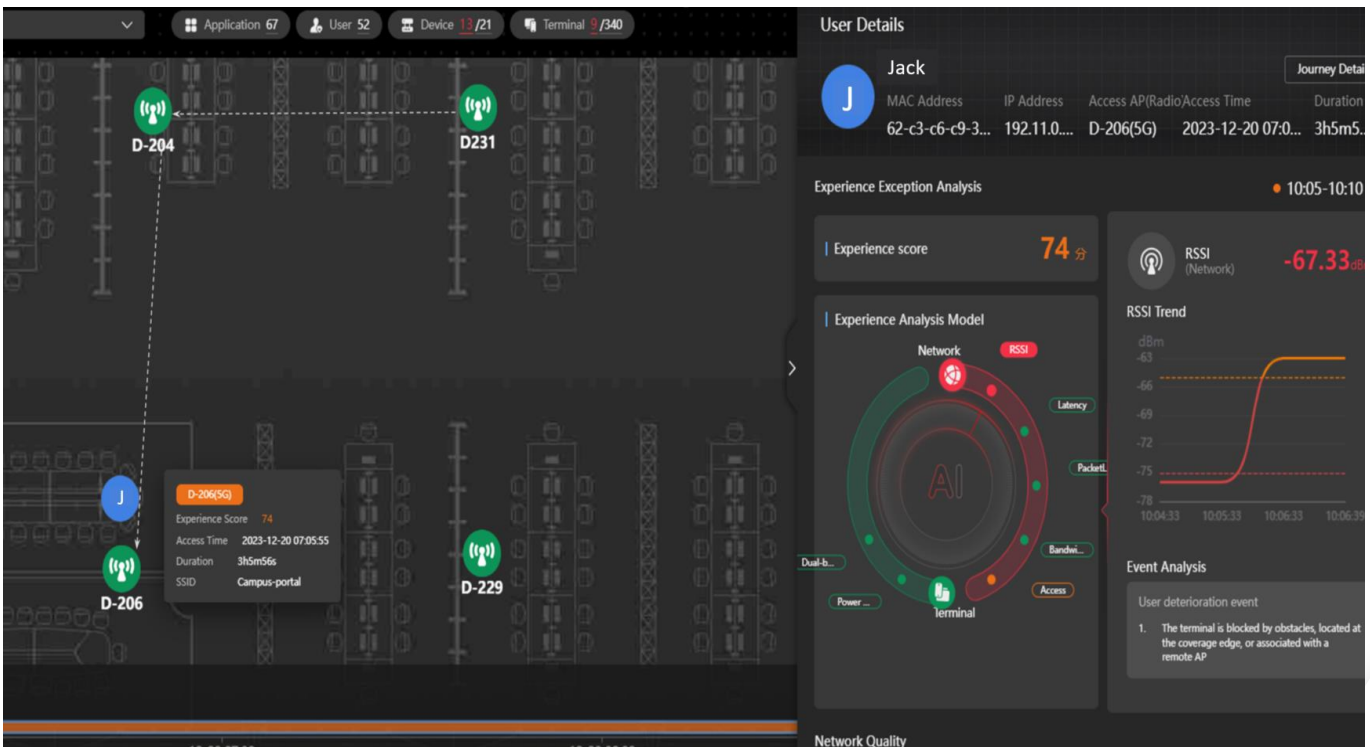
Intelligent O&M

A digital map clearly displays network information in four dimensions: NE, user, terminal, and application.

Uses digital maps to quickly demarcate and locate user experience problems based on time and space, intuitively displays the packet interaction process, and allows users to trace the entire journey experience. Users can quickly analyze the causes of user experience deterioration and quickly handle the deterioration, ensuring the ultimate experience of VIP users. Precise application identification on digital maps, LAN-WAN E2E road conditions, application traffic distribution, and application status are visible, and key application experience measurement from wireless air interfaces to wired networks is implemented. Key application assurance is achieved in three steps, policy AI generation is ensured, and policies are delivered in batches on the entire network, quickly optimize application experience.

Intelligent policy recommendation ensures WAN experience, implements lean management of network-wide bandwidth and congestion, and improves network-wide bandwidth utilization by 20%.

By leveraging the tidal traffic-based energy saving algorithm, the system identifies energy saving during off-peak hours and automatically executes energy saving policies, which help maximizes coverage while minimizing power consumption. In addition, assurance APs are reserved. This guarantees an enhanced network experience and reduces energy consumption by 30%.



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Specifications List

Key feature	Value
Simplified network deployment	<ul style="list-style-type: none"> Provides plug-and-play deployment modes for network devices, such as code scanning-free remote deployment, barcode scanning-based deployment via a mobile app, DHCP-based deployment, deployment through the registration query center, email-based deployment, and ZTP-based deployment of POL devices, to adapt to different network scenarios. Supports GUI-based network planning and deployment, implementing network provisioning in minutes. Supports hierarchical template-based batch configuration replication, deployment, and quick deployment and modification of massive multi-branch configurations. Supports unified management and monitoring for various devices, such as switches, firewalls, AR routers, APs, POL devices, NE routers, and third-party devices.
Automatic virtual network service provisioning	<ul style="list-style-type: none"> Supports visualized service configuration and GUI-based planning, configuration, and provisioning. Supports topology-based virtual network configuration and monitoring, and real-time service provisioning status query. Supports automatic VXLAN tunnel establishment through BGP EVPN. Supports centralized and distributed VXLAN gateway solutions, providing flexible expansion and high efficiency.
SD-WAN unified management	<ul style="list-style-type: none"> Automatic service deployment: supports automatic configuration of all services, such as service policies, value-added service orchestration, and dynamic VPN connections, simplifying branch network deployment. Application experience-prioritized: supports bandwidth- and link quality-based traffic steering. Visualized O&M: visualizes application traffic and network status and implements visualized management of applications and links, making the network status perceptible and improving O&M efficiency. Intelligent policy recommendation implements load balancing based on network-wide planning, improving network-wide bandwidth utilization by 20%.
One network across LANs and WANs	<ul style="list-style-type: none"> Supports unified management of campus, WAN access, and backbone networks. Supports SRv6-based dynamic traffic steering for private lines such as MSTP, MPLS, Internet, and 5G. Supports WAN path navigation, maximizing network resource utilization.
Multi-tenant management	<ul style="list-style-type: none"> Adopts a three-level user management model covering system, MSP, and tenant administrators. The system administrator is responsible for platform-wide management and O&M. The MSP administrator can create tenants and provide network construction and maintenance services for tenants. The tenant administrator is responsible for deployment and O&M of the local network; alternatively, the tenant administrator can authorize an MSP to manage tenant networks. Supports rights- and domain-based management. In the three-level user management model, administrators can be set by role and site to secure network management. Isolates services and data of tenants.
User access authentication	<ul style="list-style-type: none"> Supports the new authentication protocol HTTP/2, centrally manages a vast number of devices, authenticates users' network access. Provides multiple user authentication modes, such as 802.1X, Portal, SMS, and social media authentication, flexibly meeting user policy control requirements. Decouples users from IP addresses, allowing users to access the network anytime, anywhere with consistent permissions. This enables free mobility and consistent user experience, as well as ensures better user experience while meeting permission control requirements. Supports HWTACACS authentication and authorization for device administrators upon device logins. Supports 5G terminal access authentication capabilities, ensuring that 5G terminals can access enterprises' campus networks in a secure and reliable mode.
Intelligent terminal management	<ul style="list-style-type: none"> Provides built-in terminal fingerprint databases to accurately identify terminal types through multiple methods such as intelligent identification. Supports intelligent access of a vast number of IoT terminals, automatically matches and delivers policies, achieving plug-and-play of IoT terminals. Supports fast access of IoT terminals on the IoT sensing network, improving access security of IoT terminals. Supports AI clustering identification for unknown terminals. Unknown terminals with similar fingerprints are clustered into one group. After an administrator marks their terminal type, subsequent terminals of this type can be automatically identified.
Intelligent verification	<ul style="list-style-type: none"> Supports snapshot comparison. By comparing snapshots, users can discover configuration, topology, and table entry differences between networks at different time points. Provides users with a global perspective of IP subnet connectivity. Supports terminal access permission verification through 100% digital modeling of the network environment and real-time, simulation, ensuring a secure and reliable network.
Intelligent HQoS	<ul style="list-style-type: none"> Supports hierarchical QoS scheduling based on user and service priorities. As such, different policies are enforced for different users and applications.
Digital Map	<ul style="list-style-type: none"> Supports intuitively display network information at four dimensions (NE, user, terminal, and application). enables rapid demarcation and locating of user experience issues by time and space, intuitive display of the packet exchange process, and full-journey user experience tracing. Supports accurately identify applications, visualize LAN-WAN traffic from end to end, and intuitively display application traffic distribution and status, implementing experience measurement of key applications from the wireless air interface to the wired side. Supports implements key application assurance in three simple steps, AI-powered policy generation, and batch policy delivery on the entire network, quickly optimizing application experience. Displays multi-branch WAN interconnection and intelligent policy recommendation results. Displays the overall energy saving information and effect of each branch.
Intelligent O&M	<ul style="list-style-type: none"> Uses continuous terminal training algorithms to proactively identify issues, locate faults within minutes, and intelligently predict faults. As a result, 90% of potential network issues can be identified and feasible rectification suggestions are provided accordingly. Supports real-time evaluation of channel conflicts, predictive optimization, and comparison of gains before and after optimization, improving wireless network performance by over 50%.

Specification List (Continued)

Key feature	Value
Energy saving	<ul style="list-style-type: none"> Visualizes network energy consumption and energy efficiency ratio in real time from multiple dimensions, such as the entire network, site, floor, and device. Based on the tidal pattern of campus Wi-Fi network traffic, intelligently recommends energy saving time windows using the grouping algorithm, identifies energy saving during off-peak hours, and automatically executes energy saving policies, implementing dynamic energy saving for tidal traffic. Maximizes coverage while minimizing power consumption. Reserves assurance APs to guarantee an enhanced network experience and reduces energy consumption by 30%.
Capability openness	<ul style="list-style-type: none"> Provides 600+ RESTful northbound APIs for user management, topology management, access authentication, service configuration, and performance monitoring. Joins hands with 10+ partners to release 30+ industry applications, greatly simplifying integration with third-party systems.

Glossary of terms

AR	Augmented Reality	Augmented Reality
IoT	Internet of Things	Internet of Things
MPLS	Multiprotocol Label Switching	Multi-Protocol Label Switching
MSP	Managed Service Provider	Managed Service Provider
MSTP	Multi-Service Transport Platform	Multi-service transmission platform
NCE	Network Cloud Engine	Network cloudification engine
POL	Passive Optical LAN	Passive Optical Access LAN
SD-WAN	Software-defined networking in a wide area network	SD-WAN
SRv6	Segment Routing over IPv6	IPv6-based segment routing
VR	Virtual Reality	virtual reality
VXLAN	Virtual extensible local area network	Virtual Extended LAN

