






# Huawei NetEngine AR650 Series Enterprise Routers


Huawei AR650 series enterprise routers are 1U fixed routers designed for use in small- and medium-sized enterprise branches. The AR650 integrates various service features such as SD-WAN, routing, switching, security, DSL, Voice and WLAN, providing diversified services and high performance.

## Product Overview

Huawei's next-generation NetEngine AR650 series enterprise routers use multi-core processors and a non-blocking switching structure, helping to deliver three times the industry average performance. The NetEngine AR650 also integrates functions such as SD-WAN, cloud management, routing, switching, VPN, WLAN, and security, ensuring diversified and cloud-based services are fully supported. Huawei NetEngine AR650 series enterprise routers can be deployed at branches of SMBs and small-sized enterprises as required to provide enterprise network egress capabilities.

NetEngine AR650 series consists of models such as the NetEngine AR651C, NetEngine AR651, NetEngine AR651W, NetEngine AR651EW, NetEngine AR651W-8P, NetEngine AR657W. Huawei provides various models which can meet networking requirements of enterprises of different scales.

 <p>NetEngine AR651C</p>	<ul style="list-style-type: none"> <li>• Fixed WAN ports: 2*GE SFP, 2*GE RJ45</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Dimensions (H x W x D): 43.6 mm x 250.0 mm x 210.0 mm</li> </ul>
 <p>NetEngine AR651</p>	<ul style="list-style-type: none"> <li>• Fixed WAN ports: 2*GE Combo</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Dimensions (H x W x D): 44.0 mm x 300.0 mm x 216.4 mm</li> </ul>
 <p>NetEngine AR651W</p>	<ul style="list-style-type: none"> <li>• Fixed WAN ports: 2*GE Combo</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Wi-Fi: 802.11 ac/b/g/n</li> <li>• Dimensions (H x W x D): 44.0 mm x 300.0 mm x 216.4 mm</li> </ul>
 <p>NetEngine AR651EW</p>	<ul style="list-style-type: none"> <li>• Fixed WAN ports*: 2*10GE SFP+, 2*GE RJ45</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Wi-Fi: 802.11 ax/ac/b/g/n</li> <li>• Dimensions (H x W x D): 44.0 mm x 300.0 mm x 216.4 mm</li> </ul>
 <p>NetEngine AR651W-8P</p>	<ul style="list-style-type: none"> <li>• Fixed WAN ports: 2*GE Combo</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Wi-Fi: 802.11 ac/b/g/n</li> <li>• PoE: compliance with IEEE 802.3af and 802.3at</li> </ul>

 <p style="text-align: center;">NetEngine AR657W</p>	<ul style="list-style-type: none"> <li>• Dimensions (H x W x D): 44.0 mm x 300.0 mm x 216.4 mm</li> <li>• Fixed WAN ports: 2*GE Combo, 1VDSL 35B</li> <li>• Fixed LAN ports: 8*GE RJ45(can be configured as WAN)</li> <li>• Wi-Fi: 802.11 ac/b/g/n</li> <li>• Dimensions (H x W x D): 44.0 mm x 300.0 mm x 216.4 mm</li> </ul>
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\*Note: NetEngine AR651EW 10GE optical ports is also compatible with GE/2.5GE speed.

## Features and Benefits

### Features and Benefits

Service Requirement	Features and Benefits
High performance	<ul style="list-style-type: none"> <li>• Multi-core processors and a non-blocking switching structure</li> <li>• Three times the industry average performance, providing the lowest latency for key services</li> </ul>
High reliability	<ul style="list-style-type: none"> <li>• Link backup for enterprise services, improving reliability</li> <li>• Fault detection and determination in milliseconds, minimizing service interruption time</li> </ul>
Easy O&M	Multiple management modes, including SD-WAN management, SNMP-based network management, web-based network management, and cloud-based management, simplifying network deployment and reducing OPEX
Service convergence	Integration of functions such as routing, switching, VPN, security, and WLAN, meeting diversified enterprise service requirements, saving space, and reducing TCO
Security	Built-in firewall, IPS(AR651/AR651W/AR651EW/AR651W-8P/AR657W), URL filtering, Antivirus(AR651/AR651W/AR651EW/AR651W-8P/AR657W) and multiple VPN technologies, providing comprehensive security protection capabilities
SD-WAN	<ul style="list-style-type: none"> <li>• Built-in SD-WAN solution, building cost-effective and business-friendly connections over the Internet</li> <li>• ZTP (Email-, USB-, DHCP-based and Registration Query Center deployment), minimizing skill requirements and provisioning devices in minutes</li> <li>• First packet identification (FPI) for SaaS applications and service awareness for complex applications, identifying over 90% of applications</li> <li>• Traffic steering based on bandwidth and link quality, ensuring experience of key applications and improving bandwidth utilization to up to 90%</li> </ul>

### Architecture Highlights

Architecture Feature	Benefits
Multi-core processor	High-performance multi-core processors, supporting high-speed WAN connections, powerful route calculation capabilities, and enhanced L4-L7 service processing
Extensive network interfaces	Extensive flexible interface such as 10M/100M/GE/2.5G/10G speed, 5G RU, LTE CAT4/CAT6, 3G, xGPON, VDSL/ADSL, Wi-Fi 5/Wi-Fi 6 and POE/POE+

# Product Specifications

## NetEngine AR650 Series Technical Specifications

Item	NetEngine AR651C	NetEngine AR651	NetEngine AR651W	NetEngine AR651W-8P	NetEngine AR657W	NetEngine AR651EW
<b>System Parameters</b>						
Forwarding Performance (LAN - > WAN + WAN - > LAN, NAT + ACL + QoS, IMIX, Default)	1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps	1 Gbps
Forwarding Performance (LAN - > WAN + WAN - > LAN, NAT + ACL + QoS, IMIX, Boost License)	1.5 Gbps	2 Gbps	2 Gbps	2 Gbps	2 Gbps	2 Gbps
SD-WAN performance (1400 Bytes) *	1400Mbps	1800Mbps	1800Mbps	1800Mbps	1800Mbps	1800Mbps
SD-WAN performance (IMIX)*	600Mbps	800 Mbps	800 Mbps	800 Mbps	800 Mbps	800Mbps
IPsec performance (IMIX)	1 Gbps	2 Gbps	2 Gbps	2 Gbps	2 Gbps	2 Gbps
IPsec performance (1400 bytes)	2 Gbps	3.7 Gbps	3.7 Gbps	3.7 Gbps	3.7 Gbps	3.7 Gbps
Fixed WAN ports	2 x GE SFP, 2 x GE RJ45	2 x GE combo	2 x GE combo	2 x GE combo	2*GE Combo, 1VDSL 35B	2 x 10GE SFP+, 2 x GE RJ45
Fixed LAN ports	8 x GE RJ45 (can be configured as WAN)					
Service extension slot	-	1 x MIC LTE	1 x MIC LTE	1 x MIC LTE	1 x MIC LTE	1 x MIC LTE
Standards compliance and frequency bands supported for MIC LTE Cards	<ul style="list-style-type: none"> <li>● MIC-1ELTE6-EA (LTE CAT6) LTE FDD: Band 1/3/5/7/8/20/28/32 LTE TDD: Band 38/40/41 2xCA: B1+B1/B5/B8/B20/B28, B3+B3/B5/B7/B8/B20/B28, B7+B5/B7/B8/B20/B28, B20+B32, B38+B38, B40+B40, and B41+B41 WCDMA: Band 1/3/5/8</li> <li>● MIC-1LTE6-EA (LTE CAT6) LTE FDD: Band 1/3/7/8/20/28 LTE TDD: Band 38 CA: Bands 1+3/8, Bands 3+3/7/8/20/28/38, and Bands 7+7/20/28 WCDMA: Band 1/8 GSM: 900/1800 (MHz)</li> <li>● MIC-LTE4EA-V2 (LTE CAT4) LTE FDD: Band 1/3/5/7/8/20/28 LTE TDD: Band 38/40/41</li> </ul>					

Item	NetEngine AR651C	NetEngine AR651	NetEngine AR651W	NetEngine AR651W-8P	NetEngine AR657W	NetEngine AR651EW
		WCDMA: Band 1/5/8				
Wi-Fi	-	-	Dual-band (2.4 GHz and 5 GHz), 802.11b/g/n/ac			Dual-band (2.4 GHz and 5 GHz), 802.11b/g/n/ac/ax
xDSL	-	-	-	-	ADSL Annex A, M, B and J, T1.413 ANSI ADSL DMT issue 2, ITU G.993.2 (VDSL2), VDSL2 Vectoring (G993.5)	-
PoE	-	-	-	PoE+/POE	-	-
PoE capability	-	-	-	GE0 to GE7 support PoE+ out, Maximum output power of 100 W	-	-
USB port	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB	1 x USB
Auxiliary or console port	1 x RJ45 console port					
Memory	1 GB	2 GB	2 GB	2 GB	2 GB	2 GB
Flash memory	1 GB	1 GB	1 GB	1 GB	1 GB	1 GB
<b>Dimensions and Weight</b>						
Router dimensions, With no mounting bracket installed (W x D x H)	300.0mm x 220.3mm x 44.0mm	300.0mm x 220.3mm x 44.0mm	300.0mm x 220.3mm x 44.0mm	300.0mm x 220.3mm x 44.0mm	300.0mm x 220.3mm x 44.0mm	300.0mm x 220.3mm x 44.0mm
Packaging dimensions (W x D x H)	435mm x360mm x 110mm	435mm x360mm x 110mm	435mm x360mm x 110mm	435mm x 360mm x 110mm	435mm x 360mm x 110mm	435mm x360mm x 110mm
Weight	1.75 kg	1.8 kg	1.9 kg	1.9 kg	1.88 kg	1.9 kg
Rack	IEC	IEC	IEC	IEC	IEC	IEC
Occupied rack space	1U	1U	1U	1U	1U	1U
<b>Power Specifications, Power Consumption, and Heat Dissipation</b>						
Rated input voltage range (AC)	100 V to 240 V	100 V to 240 V	100 V to 240 V	100 V to 240 V	100 V to 240 V	100 V to 240 V

Item	NetEngine AR651C	NetEngine AR651	NetEngine AR651W	NetEngine AR651W-8P	NetEngine AR657W	NetEngine AR651EW
Rated input frequency (AC)	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Maximum input voltage range (AC)	90 V to 264 V	90 V to 264 V	90 V to 264 V	90 V to 264 V	90 V to 264 V	90 V to 264 V
Maximum input current (AC)	3 A	3 A	1.5 A	1.5 A	1.5 A	1.5 A
Maximum output power (AC)	36 W	36 W	60 W	60 W	60 W	60 W
Minimum power consumption	15 W	22 W	31 W	26 W	34 W	27 W
Maximum power consumption	22 W	29 W	42 W	117 W	45 W	45 W
Fan module	Natural heat dissipation, without fans	Built-in unpluggable fan modules				
Airflow	N/A	Left to right	Left to right	Left to right	Left to right	Left to right
Noise level	N/A	41.9dB	47.4dB	47.4dB	47.4dB	34dB
<b>Environment Parameters</b>						
Operating temperature	0 ° C to 45 ° C					
Operating humidity	5% to 95% (non-condensing)					
Operating altitude	< 5000 m (16404.2 ft.)					
Storage temperature	-40 ° C to +70 ° C					
Storage altitude	< 5000 m (16404.2 ft.)					
<b>Safety and Regulatory Standards</b>						
EMC standards compliance	CISPR32 Class A EN 55032 Class A CISPR24 EN 55024 ETSI EN 300 386 ETSI EN 301 489-1 ETSI EN 301 489-17 ETSI EN 301 489-52					
Environmental standards compliance	RoHS REACH WEEE					
Safety standards compliance	IEC 60950-1 EN 60950-1					
<b>Features and Protocols</b>						
Basic function	DHCP server/client/relay, PPPoE server/client, PPPoA server/client, PPPoEoA server/client, NAT, and sub-interface management					

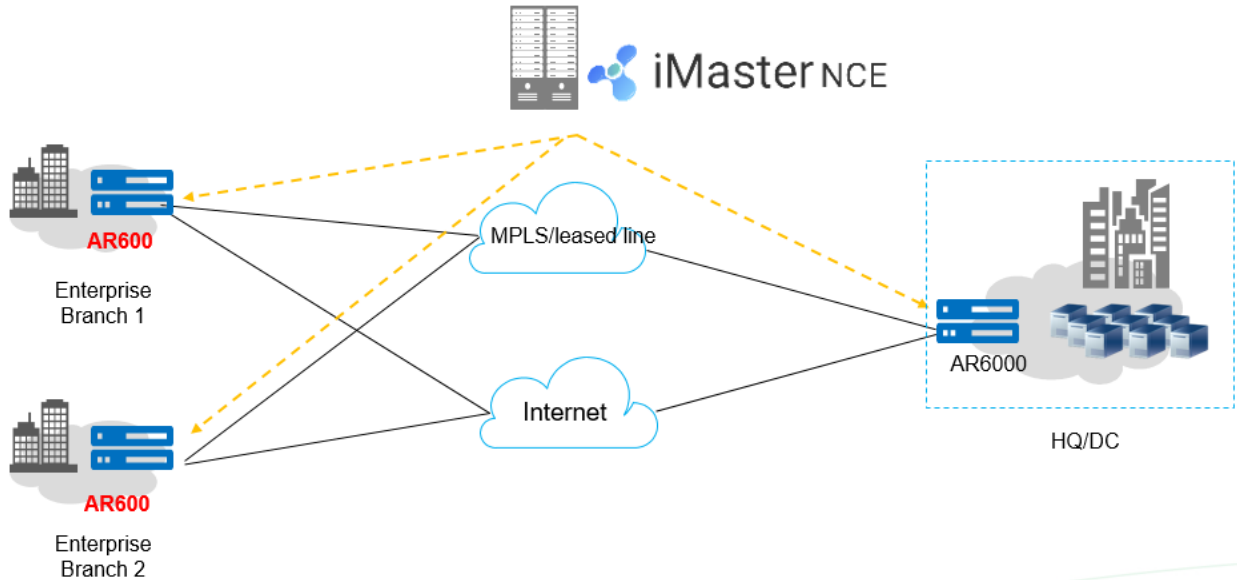
Item	NetEngine AR651C	NetEngine AR651	NetEngine AR651W	NetEngine AR651W-8P	NetEngine AR657W	NetEngine AR651EW
LAN	IEEE 802.1P, IEEE 802.1Q, IEEE 802.3, VLAN management, VLAN aggregation, MAC management, STP/RSTP					
3G/LTE	-	LTE FDD, LTE TDD, DC-HSPA+, HSPA+, HSPA, WCDMA, EDGE, GPRS and GSM				
WLAN (AC)	AP management (AC discovery, AP access, and AP management), CAPWAP, WLAN user management, WLAN radio management (802.11a/b/g/n/ac), WLAN QoS (WMM), and WLAN security (WEP, WPA, WPA2, key management)					
WLAN (AP)	-	AP management, WLAN QoS (WMM), WLAN security (WEP/WPA/WPA2/key management), WLAN radio management (802.11b/g/n/ac/ax), and WLAN user management				
IPv4 unicast routing	Routing policies, static routes, RIP, OSPF, IS-IS, BGP					
IPv6 unicast routing	Static routes, routing policies, RIPng, OSPFv3, IS-ISv6, BGP4+					
Basic IPv6 function	IPv6 ND, IPv6 PMTU, IPv6 FIB, IPv6 ACL, ICMPv6, DNSv6, DHCPv6					
IPv6 tunneling	Manual tunnel, automatic tunnel, GRE tunnel, IPv6 over IPv4 tunnel, 6 to 4 tunnel, ISATAP					
Multicast	IGMP v1/v2/v3, PIM-SM, PIM-DM, MSDP, MBGP, IPv6 PIM, MLD					
MPLS	-	LDP, MPLS L3 VPN, VLL, PWE3, static LSP, dynamic LSP, MPLS TE, IP FRR, LDP FRR, TE FRR				
VPN	IPsec VPN, GRE VPN, DSVPN, A2A VPN, L2TP VPN, L2TPv3 VPN, Ethernet over GRE, EVPN, VLL, VPLS, VxLAN					
QoS	DiffServ mode, priority mapping, traffic policing (CAR), traffic shaping, congestion avoidance, congestion management, MQC (traffic classifier, traffic behavior, and traffic policy), hierarchical QoS, WLAN QoS, FR QoS, Smart Application Control (SAC), SPR					
WAN Optimization	A-FEC, Multi-fed and Selective receiving, per-packet load balancing					
Security	ACL (v4/v6), domain-based stateful firewall, 802.1X authentication, MAC address authentication, portal authentication, AAA authentication, RADIUS authentication, HWTACACS authentication, PKI, broadcast storm suppression, ARP security, ICMP attack defense, URPF, CPCAR, blacklist, attack source tracing, online behavior management, IPS, URL filtering and Antivirus					
Management and maintenance	Upgrade management, device management, web-based network management, GTL, SNMP (v1/v2c/v3), RMON, NTP, CWMP, Auto-Config, URL-based/USB-based/DHCP deployment, NETCONF/YANG, CLI, Netstream, IP FPM, TCP FPM, TWAMP Light, IP accounting, NQA					

\*The SD-WAN performance model is EVPN + IPsec + QoS, with the performance data being the sum of bidirectional flows.

## Networking and Application

- **SD-WAN Using Hybrid Links**

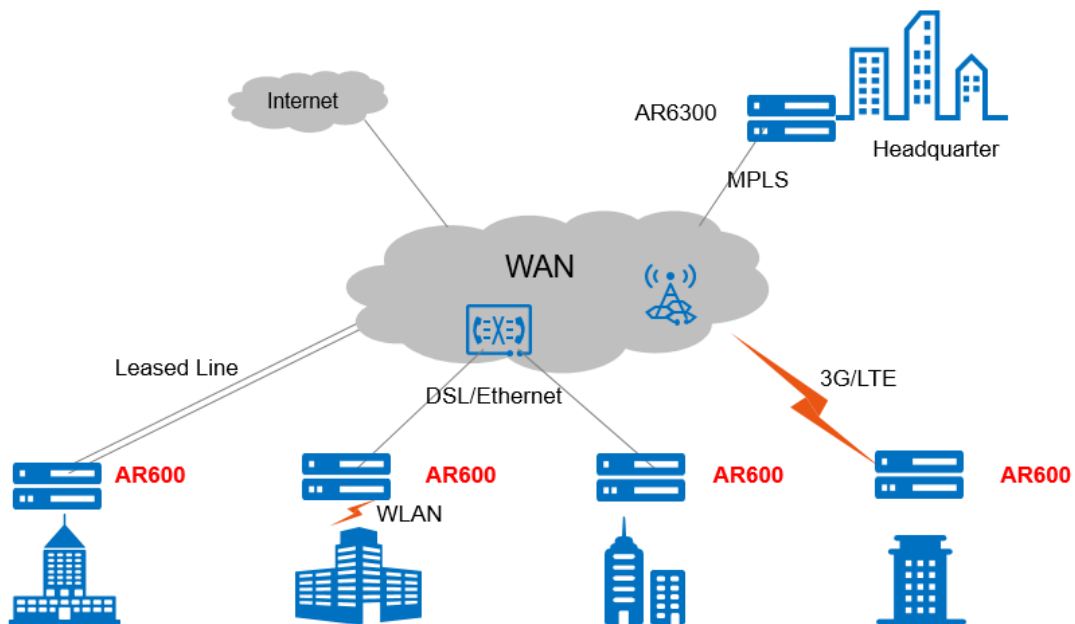
In the SD-WAN Solution, the NetEngine AR650 functions as the gateway of SMBs and small-sized enterprise branches and supports hybrid access using multiple physical links, such as Internet links, and LTE links. The solution also leverages Huawei's next-generation controller, the Agile Controller, which implements centralized and visualized management. The NetEngine AR650 provides extensive SD-WAN features and delivers optimal service experience for enterprises through intelligent application identification, intelligent traffic steering, and intelligent acceleration. For details about Huawei SD-WAN Solution, visit <https://e.huawei.com/en/solutions/business-needs/enterprise-network/sd-wan>.



**WAN Interconnection Scenario**

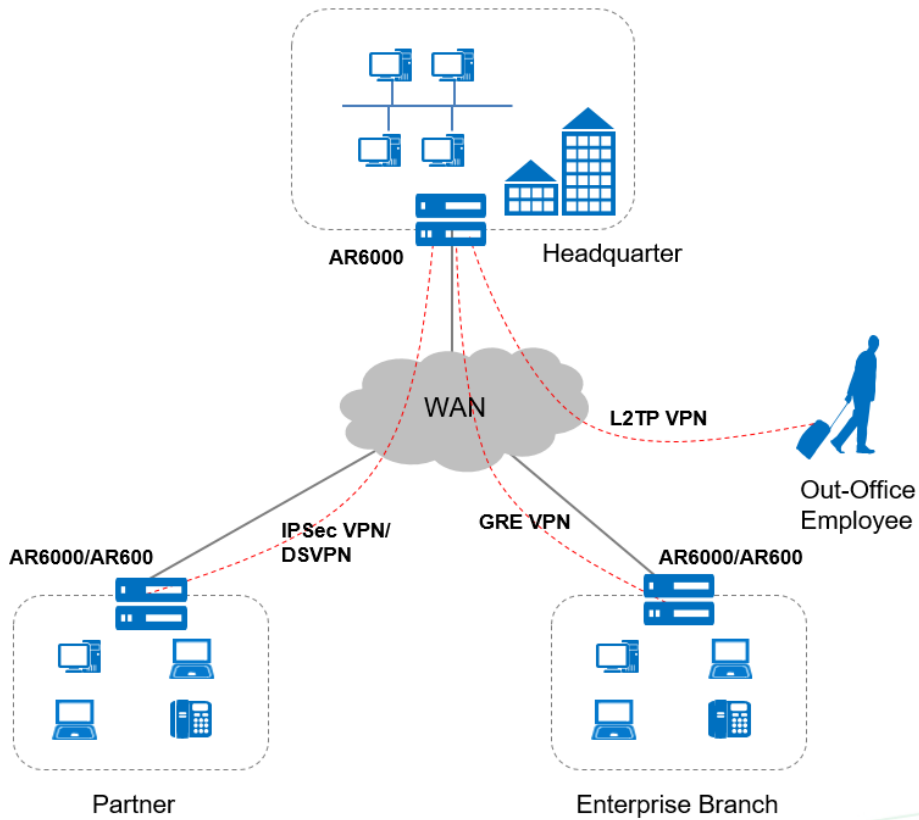
In this scenario, the NetEngine AR650 series routers are used as enterprise branch egresses and provide flexible WAN access methods to support remote network connections. A single NetEngine AR650 router can satisfy different access requirements, for example, for the private line, Ethernet, 3G, LTE, and WLAN access, helping the customer reduce deployment and maintenance costs while helping them extract much value.

WAN interconnection networking



**Building Different Types of VPNs by Leveraging Internet Resources**

The NetEngine AR650 provides various secure access functions for communication between enterprise branches and between branches and headquarters. These functions also allow an enterprise's partners to access its resources. Secure tunnels such as GRE VPN, IPSec VPN, DSVPN, L2TP VPN, and EVPN tunnels can be set up between the headquarters and branches for secure data access and transmission. The NetEngine AR650 supports quick tunnel deployment and authentication for branches. Furthermore, partners authenticated and authorized by the AR650 can remotely access the enterprise resources over these tunnels.



## Ordering Information

The NetEngine AR650 series routers are configured by selecting and installing the appropriate configuration module. The configuration module ordering information and descriptions are shown in the following tables.

The NetEngine AR650 sub series routers require 3 types of configuration modules:

- Basic software configuration
- Software license configuration
- Performance license configuration

The basic software configuration modules provide functions such as routing, switching, voice, and security.

The software license configuration modules provide additional functions such as SRP, DSVPN.

### License function and description

License Name	Description
Value-Added Data Package	Smart Policy Routing (SPR), MPLS L2VPN and L2TPv3 are included is included
Value-Added Security Package*	Efficient VPN, DSVPN, Smart Application Control (SAC), Any to Any VPN, IPS, URL filtering and AV functions
Security License-AR650	Threat Protection Subscription Service (include IPS, URL, AV) (AR650)
AR650 Performance	Improve the forwarding performance of AR650 series from 1 Gbit/s to 2 Gbit/s.
AR600&6100&6200&6300 Passive Optical Network Value-added Package	Support xGPON optical module
N1-Campus-F-AR600	N1-CloudCampus (exclude SD-WAN), Foundation, AR600 Series
N1-LANWAN-F-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Foundation, AR600



License Name	Description
N1-LANWAN-A-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Advanced, AR600
N1-FToA-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Upgrade Foundation to Advanced, AR600 Series
N1-APP-AR600	N1-CloudCampus SD-WAN Add-On, Intelligent Application Analysis, AR600 Series

\*Online update service license "Security License-AR650" is required for update IPS, URL filtering and Antivirus function.

#### Ordering components

Chassis Configuration	Description
NetEngine AR651C	AR651C AC host, 10*GE RJ45,2*GE SFP, 1*USB, with the AC/DC adapter
NetEngine AR651	AR651,2*GE combo WAN,8*GE LAN,1*USB,1*MIC slot
NetEngine AR651W	AR651W,2*GE combo WAN,8*GE LAN,1*USB,802.11b/g/n/ac,2*2MIMO,1*MIC slot
NetEngine AR651EW	AR651EW,2*10GE SFP+ WAN,8*GE LAN,1*USB,802.11b/g/n/ac/ax,2*2MIMO,1*MIC slot
NetEngine AR651W-8P	AR651W-8P,2*GE combo WAN,8*GE LAN (PoE+),1*USB,802.11b/g/n/ac,2*2MIMO,1*MIC slot
NetEngine AR657W	AR657W,2*GE combo WAN,1*VDSL 35B WAN,8*GE LAN,1*USB,802.11b/g/n/ac,2*2 MIMO,1*MIC slot
Mounting Ear	Description
E200BMA00	IEC Box mounting ear (AR650)
MIC Card	Description
MIC-1ELTE6-EA	Function module, AR, MIC-1ELTE6-EA, WCDMA/LTE FDD/LTE TDD CAT6 interface card
MIC-1LTE6-EA	Function module, AR, MIC-1LTE6-EA, FDD/TDD/HSPA+/WCDMA CAT6 interface card
MIC-LTE4EA-V2	Function module, AR, MIC-LTE4EA-V2, TDD/FDD/WCDMA/HSPA+ Interface Card
Accessories of Chassis (LTE antenna)	Description
ASMAM0006	Omni-directional Antenna, 698MHz-960MHz/1710MHz-2690MHz,1.0dBi(698MHz-960MHz) &3dBi(1710MHz-2690MHz),10W, SMA-J
ASMAM0008	Isotropic Antenna, 698MHz~960MHz/1420MHz~2690MHz,2.1dBi(max)(698-960/2110-2170MHz)/4.6dBi(max)(1710-1990/2500-2690MHz), vertical, Omni,5W,SMA-J,No Bracket
ARRFSMA0601	RF Cable Parts,6m, SMA-J,240 Series,SMA-K
License	Description
LAR0DATAE08	AR600 Value-Added Data Package
LAR0SECE08	AR600 Value-Added Security Package
LAR0TP1007	Threat Protection Service Subscribe 3 Year (Applies to AR650)
LAR0PERFE08	AR650 Performance license
LAR0PONE01	AR600&6100&6200&6300 Passive Optical Network Value-added Package
N1-Campus-F-AR600	N1-CloudCampus (exclude SD-WAN), Foundation, AR600 Series
N1-LANWAN-F-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Foundation, AR600

N1-LANWAN-A-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Advanced, AR600
N1-FToA-AR600	N1-CloudCampus SD-WAN (include SD-WAN), Upgrade Foundation to Advanced, AR600 Series
N1-APP-AR600	N1-CloudCampus SD-WAN Add-On, Intelligent Application Analysis, AR600 Series

# More Information

For more information about Huawei next-generation AR enterprise routers, visit <http://e.huawei.com> or contact us in the following ways:


- Global service hotline: <http://e.huawei.com/en/service-hotline>
- Logging in to the Huawei Enterprise technical support website: <http://support.huawei.com/enterprise/>  
Sending an email to the customer service mailbox: [support\\_e@huawei.com](mailto:support_e@huawei.com)

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