

H3C CR16000-F Core Routers

Overview

H3C CR16000-F Core Routers (hereinafter referred to as the CR16000-F routers) as the high-end router, focusing on Carriers Backbone/MAN and Large-Scale Industry Core Network, providing high forwarding performance, high-density ports, and rich port types. CR16000-F routers adopt CLOS architecture and distributed forwarding structure, delivering more high-availability and scalable network. Comware V7 operating system enables the CR16000-F more compatibility, which integrating Security Blade, Open Application Platform Module, making it an ideal choice for customers.

The CR16000-F routers includes the following models: CR16006-F, CR16010-F, CR16010H-F and CR16018-F to covering all network layers, providing 4/8/8/16 service slots.



H3C CR16000-F Core Routers

Features and Benefits

Innovative virtualization technology IRF on WANs

Traditional WANs uses links and devices in 1+1 redundancy for availability, which enhances network reliability but results in low link and device utilization and increased management and maintenance complexity. To meet the virtualization requirements for the future cloud computing network, H3C deploys the IRF technology on WAN devices. The IRF technology virtualizes multiple physical devices into an IRF fabric, greatly reducing network management and maintenance costs, increasing link bandwidth and device utilization. With the IRF technology, the CR16000-F routers provide the following benefits:

- Uses the multi-chassis link aggregation technology to implement load balancing and backup for multiple uplinks. This improves network reliability and increases link resources efficiency.

- Virtualizes multiple CR16000-F routers into an IRF fabric to provide unified control plane and forwarding plane. This simplifies network topology, improves management efficiency, and reduces maintenance costs.
- Uses the H3C-proprietary routing stateful failover technology to perform real-time data backup on the control plane and data plane in the entire virtualization architecture. This avoids service interruption caused by a single point of failure.

Powerful BRAS functions

Traditional service routers provide telecommunications services such as mobile, business, and IPTV services. BRAS devices act as access gateways to broadband network applications, and implement user authentication and management. The CR16000-F combines the service router and BRAS functions to improve the device usage and reduces costs.

- Intelligent target accounting (iTA)—Differentiates service types based on the destination addresses and provides accounting, bandwidth control, and QoS as per the service types.
- Provides unified access authentication for large numbers of wired and wireless users and meets requirements of wireless terminals for mobility and once-for-all authentication.
- BRAS IRF stateful failover—Avoid service interruption caused by a single point of failure and simplifies management and maintenance.

Industry-leading network operating system

The CR16000-F router control plane uses the multi-core and SMP technologies, and runs the Comware V7 platform. Each software module operates with an independent address space, and supports dynamic loading and separate upgrading.

The Comware V7 platform supports distributed computing. Global services, such as MPLS and BGP, can be assigned to the specified MPU CPU system. The distribution of global services to different MPU CPU systems reduces CPU load and enhances system performance. Distributed computing also allows the system to divide a global service into sub-services and distribute the sub-services on different CPU systems.

Comprehensive Services

The CR16000-F router uses Open Application Architecture (OAA) and provides Open Application Platform (OAP) modules to meet service customization and upgrade needs. For example, firewall modules, intrusion prevention system (IPS) modules, and LB modules provide seamless integration of core routers and service systems.

High Performance and Reliability

- CR16000-F router support 800Gbps forwarding performance for each slot, providing high-density 10GE / 40GE / 100GE ports.
- CR16000-F routers provide all key components redundancy, including control board, independent switching fabric, power supply, fan, etc.
- CR16000-F routers support provide abundant reliability features to assure the network available even if link or node failure, such as BFD, LAG, NQA, ECMP, FRR, and so on.

Technical Specifications

Item	CR16006-F	CR16010-F	CR16010H-F	CR16018-F
MPU slots	2	2	2	2
Line card slots	4	8	8	16
Chassis	Integrated chassis, which can be installed in a 19-inch rack			
Independent switch fabrics	4	4	5	5
Max Forwarding Capacity	1.6 Tbps	6.4 Tbps	12.8Tbps	25.6Tbps
Bi-direction Forwarding Capacity/slot	400 Gbps	800 Gbps	1.6 Tbps	1.6T bps
Power module system	Support for 4 power modules (AC or DC) and N+M redundancy	Support for 6 power modules (AC or DC) and N+M redundancy	Support for 8 power modules (AC or DC) and N+M redundancy	Support for 16 power modules (AC or DC) and N+M redundancy
Dimensions (H × W × D)	353 × 440 × 660 mm (13.90 × 17.33 × 25.99 in), 8 RU	931 × 440 × 660 mm (34.89 × 17.32 × 25.98 in), 21 RU	931 × 440 × 640 mm (36.66 × 17.32 × 25.98 in), 21 RU	1687 × 440 × 640 mm (66.42 × 17.32 × 25.98 in), 38 RU
Unicast routing	<p>IPv4/IPv6 dual stack</p> <p>Static routing, RIP, RIPv6, OSPF, OSPFv3, IS-IS, IS-ISv6, BGP-4, and BGP4+ VRRP and VRRPv3</p> <p>IPv6 neighbor discovery, PMTU discovery, TCP6, ping IPv6, traceroute IPv6, socket IPv6, static IPv6 DNS, specifying an IPv6 DNS server, and TFTP IPv6 client</p> <p>IPv4 to IPv6 transition technologies</p> <p>ICMPv6 MIB, UDP6 MIB, TCP6 MIB, and IPv6 MIB, etc.</p> <p>ECMP</p> <p>Policy-based routing</p> <p>Routing policies</p> <p>Tunneling technologies, such as GRE</p> <p>IP FRR</p>			
Multicast	PIM-DM, PIM-SM, PIM-SSM, MSDP, MBGP, anycast-RP, etc.			

Item	CR16006-F	CR16010-F	CR16010H-F	CR16018-F
	IGMP V1/V2/V3 and IGMP Snooping v1/2/3 PIM6-DM, PIM6-SM, and PIM6-SSM MLD V1/V2 and MLD Snooping v1 Multicast policies and multicast QoS			
MPLS VPN	P/PE functions, compliant with the RFC 2547 bis standard Three multi-AS MPLS VPN methods (Option1/Option2/Option3) Hierarchy of PE (HoPE) Multi-role host Layer 2 MPLS VPN functions MPLS TE FRR and LDP FRR, with the failover time less than 50 ms 6PE and 6vPE Distributed multicast VPNs ACL-based traffic filtering for VPNs MPLS ping and MPLS traceroute L2VPN access to L3VPN QinQ access to VPLS			
BRAS	Remote AAA based on RADIUS/TACACS+ protocol iTA Unified access authentication for large numbers of wired and wireless users Mobility and once-for-all authentication for wireless terminals BRAS IRF routing stateful failover PPPoE, PPPoEoVLAN, and PPPoEoQ Layer 2 Portal, Layer 3 Portal, and QinQ Portal access authentication IPoE, IPoEoVLAN, IPoEoQ, DHCP, and unknown IP address access authentication VPN access authentication L2TP			
ACL	IPv4/IPv6 standard ACL and extended ACL Layer 2/Layer 3/Layer 4-based ACL Ingress/Egress ACL			
QoS	Hierarchical QoS (HQoS) and queue scheduling mechanisms including PQ, WFQ, and CBWFQ Traffic shaping TD/WRED Priority marking/remarking			

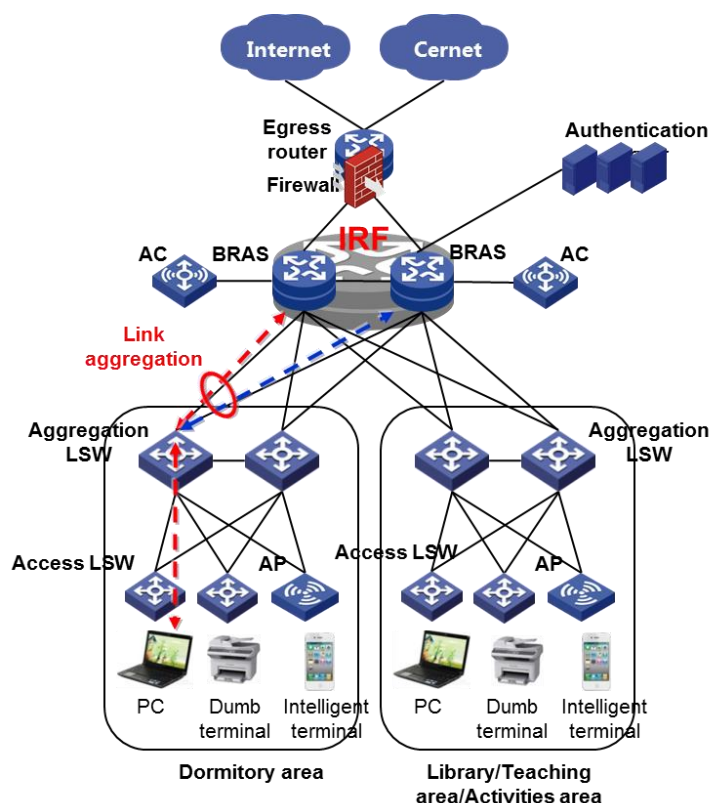
Item	CR16006-F	CR16010-F	CR16010H-F	CR16018-F
	802.1p, TOS, DSCP, and EXP priority mappings Multicast QoS			
Ethernet	802.1Q 802.1Q VLAN Trunk QinQ 802.3d (STP)/802.3w (RSTP)/802.3s (MSTP) IEEE 802.3ad (link aggregation), static port aggregation, and inter-card link aggregation Port mirroring and flow mirroring			
Virtualization	Virtualizes multiple physical devices into a virtual fabric, manages devices and device forwarding on a unified interface, and supports multi-chassis link aggregation			
Network traffic analysis	NetStream data export in v5/v8/v9 Traffic sampling and accounting Multiple log hosts Hardware-based network traffic analysis IPv4/IPv6/MPLS traffic analysis Port-based inbound and outbound traffic analysis Flow monitor to monitor illegitimate traffic flows			
Availability	1+1 redundancy backup for critical components including the MPUs, switching fabric modules, power supplies, and fans Passive design for the backplane to prevent single point of failure Hot swapping for all components NSF, NSR, and GR IP TRUNK, MP, and ETH port aggregation PW redundancy, Ethernet OAM, and Y.1731 BFD, fast failure detection for protocols and with switchover time less than 50 ms FRR with the switchover time less than 50 ms and network availability rate 99.999%			
Security	Firewall Hierarchical user management Password protection AAA SSHv2 providing secure encrypted channel for user login Standard and extended ACLs for packet filtering to prevent network attacks Preventing attacks by using ARP packets, unknown multicast packets, broadcast packets, unknown unicast packets, local subnet route scanning packets, packets			

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	whose TTL is 1, and other protocol packets URPF for preventing network attacks using source address spoofing OSPF, RIPv2 and BGPv4 plain text authentication and MD5 authentication SNMPv3			
System management	In-band and out-of-band management Command line configuration through Console/AUX Modem/Telnet/SSH2.0 File download/upload management through FTP, TFTP, Xmodem, and SFTP SNMPv1/v2/v3 RMONv1/v2, supporting 1, 2, 3 or 9 groups NTP NQA Failure alarm and automatic recovery Data logs ICMP Syslog Traceroute Multiple user-line Telnet access			

Application scenarios

BRAS solution

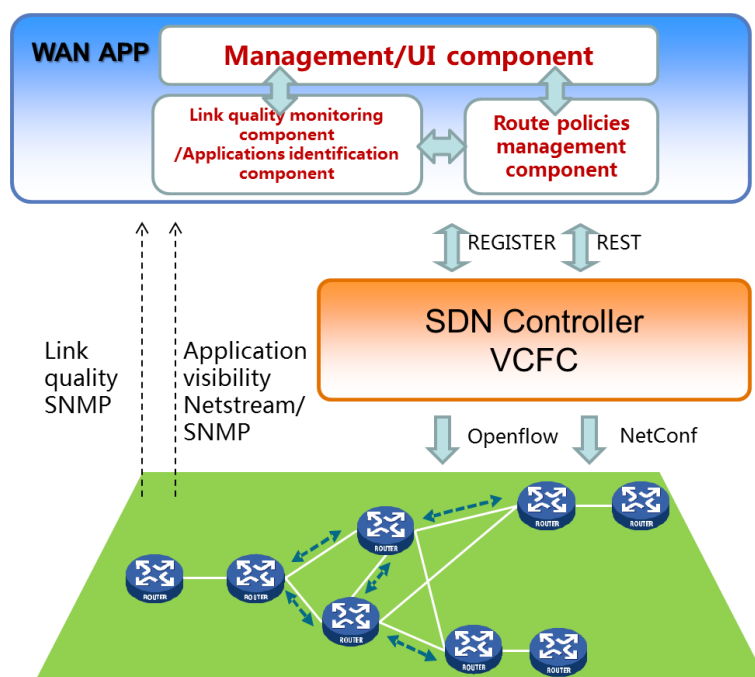
The CR16000-F router supports intelligent target accounting (iTA). iTA differentiates service types based on the destination addresses and provides accounting, bandwidth control, and QoS as per the service types. You can deploy the CR16000-F routers on campus networks to implement different rate and accounting policies for accesses to the campus network, Cernet, and Internet. With BRAS, the CR16000-F router can provide unified access authentication for large numbers of wired and wireless users and meet requirements of wireless terminals for mobility and once-for-all authentication and rate. BRAS IRF stateful failover reduces the impact of single device failures on the network and simplifies management and maintenance.



SDN solution

Traditional WANs use the shortest paths calculated based on routing protocols to forward traffic and do not switch traffic to other paths even if congestion occurs on a path. This does not have much influence when the network traffic is small. However, with the wide use of the Internet, the shortcomings of this solution become more obvious.

The WAN SDN solution dynamically acquires real-time link quality status, such as link efficiency, delay, and jitter. The DPI technology integrated on the CR16000-F router reports the service types in real time. WAN APP dynamically selects the optimal end-to-end path for the specified applications and delivers the policies to the router through the Netconf or OpenFlow interface. The SDN solution can reduce network management cost, improve network resources efficiency, dynamically adjust resources at network congestion or jitter occurrence, and provide value-added services and additional services.



Ordering Guide

Item	Description
Chassis	H3C CR16006-F core router chassis
	H3C CR16010-F core router chassis
	H3C CR16010H-F core router chassis
	H3C CR16018-F core router chassis
Power module	DC 2400W power module
	AC 2500W power module
MPU module	H3C CR16000-F Management and Route Process Unit(1L1)
	H3C CR16000-F Management and Route Process Unit(1L3)
	H3C CR16000-F Main Processing Unit(1P3)
Switching fabric module	H3C CR16006-F Switch Fabric Card(B Type)
	H3C CR16006-F Switch Fabric Card(D Type)
	H3C CR16010-F Switch Fabric Card(B Type)
	H3C CR16010-F Switch Fabric Card(D Type)
	H3C CR16010-F Fabric Module(E Type)
	H3C CR16010H-F Fabric Module(E Type)
	H3C CR16010H-F Fabric Module(T Type)

Item	Description
	H3C CR16018-F Fabric Module(E Type)
	H3C CR16018-F Fabric Module(T Type)
IO module	H3C CR16000-F 4-port 10GBASE-R/W Ethernet Optical Interface Line Processing Unit Module(SFP+,LC)
	H3C CR16000-F 24-Port 10GBASE-R/W Ethernet Optical Interface Line Processing Unit (SFP+,LC)
	H3C CR16000-F 48-Port 10GBASE-R/W Ethernet Optical Interface Module(SFP+,LC)
	H3C CR16000-F 4-Port 100GBASE Ethernet Optical Interface Module(CFP2)
	H3C CR16000-F 4-port 100G Ethernet Optical Interface Line Processing Unit(QSFP28,LC)
Service Engine module	H3C CR16000-F Service Processing Unit(1304X)
	H3C CR16000-F 4-Port Multi-Service Processing Engine1404X
	H3C CR16000-F 4-Port Multi-Service Processing Engine1504X
	H3C CR16000-F Service Processing Unit(1602X)
	H3C CR16000-F Service Processing Unit(1804X)
Sub-card module	H3C CR16000-F 4-Port 1000BASE-X/1000BASE-T Combo Interface Card
	H3C CR16000-F 10-Port 1000BASE-X Ethernet Optical Interface Card(SFP,LC)
	H3C CR16000-F 20-Port 1000BASE-X Ethernet Optical Interface Card,(SFP,LC)
	H3C CR16000-F 20-Port 1000BASE-X Ethernet Electrical Interface Card(RJ45)
	H3C CR16000-F 2-port 10GBASE-R Ethernet Optical Interface Card(SFP+,LC)-LAN
	H3C CR16000-F 2-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
	H3C CR16000-F 4-port 10GBASE-R/W Ethernet Optical Interface Card 1(SFP+,LC)
	H3C CR16000-F 5-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
	H3C CR16000-F 1-port 40G Ethernet Optical Interface Card(QSFP+,LC)
	H3C CR16000-F 1-Port 100G Optical Interface Card,(CFP,LC)
	H3C CR16000-F 20-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(CFP2,LC)
	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(QSFP28)
	H3C CR16000-F 1-port 100G Ethernet Optical Interface Card(CFP2,LC)
	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(QSFP28)
H3C CR16000-F 8-Port OC-3c/STM-1c POS Optical Interface Card,(SFP,LC)	

Item	Description
	H3C CR16000-F 4-Port OC-3c/STM-1c POS/ATM or 1-Port OC-12c/STM-4c POS/ATM Optical Interface Card,(SFP,LC)
	H3C CR16000-F 2-Port OC-3/STM-1 Channelized POS Optical Interface Card,(SFP,LC)
	H3C CR16000-F 4-Port OC-3/STM-1 Channelized POS Optical Interface Card,(SFP,LC)
	H3C CR16000-F 16-Port E1 Electrical Interface Card(HM96 Male Connector)



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