DONEWIN
Global ICT Solutions Provider

H3C CR16000-F

High-end Routers

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Overview

H3C CR16000-F 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/ 400GE 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	2.56Tbps	6.4 Tbps	25.6Tbps	51.2Tbps
Bi-direction Forwarding Capacity/slot	320 Gbps	400 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
MTBF	41.68	40.46	27.03	22.27
MTTR	0.5 hours	0.5 hours	0.5 hours	0.5 hours
Unicast routing	IPv4/IPv6 dual stack Static routing, RIP, RIPng, OSPF, OSPFv3, IS-IS, IS-ISv6, BGP-4, and BGP4+ VRRP and VRRPv3 IPv6 neighbor discovery, PMTU discovery, TCP6, ping IPv6, traceroute IPv6, socket IPv6, static IPv6 DNS, specifying an IPv6 DNS server, and TFTP IPv6 client IPv4 to IPv6 transition technologies ICMPv6 MIB, UDP6 MIB, TCP6 MIB, and IPv6 MIB, etc. ECMP Policy-based routing Routing policies Tunneling technologies, such as GRE IP FRR			
Multicast	PIM-DM, PIM-SM, PIM-SSM, MSDP, MBGP, anycast-RP, etc. 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)			

	Multi-role host
	Layer 2 MPLS VPN functions
	MPLS TE FRR and LDP FRR
	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
	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

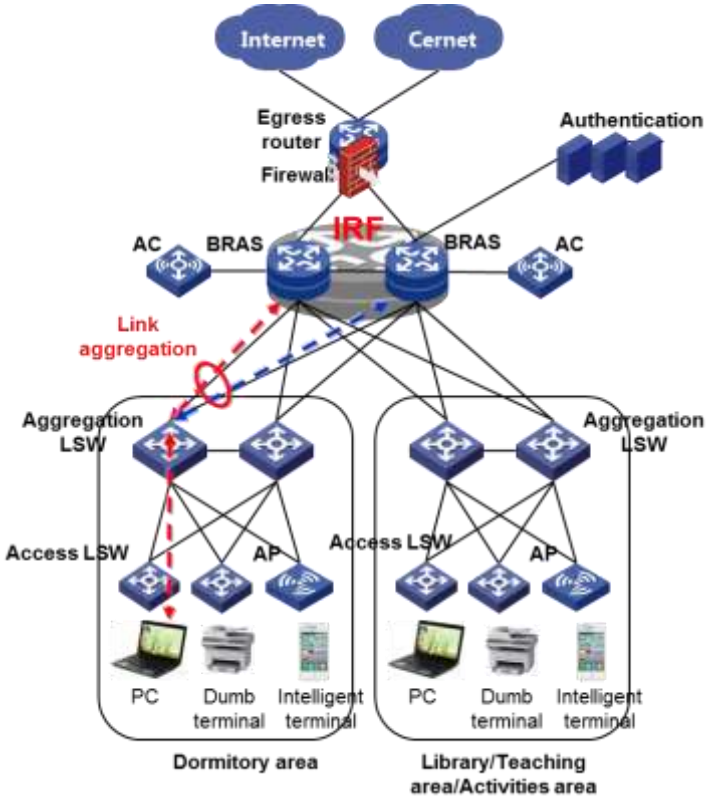
Availability	1+1 redundancy backup for critical components including the MPUs, switching fabric modules, power supplies, and fans
	Passive design for the backplane to prevent single point of failure
	Hot swapping for all components
	NSF, NSR, and GR
	IP TRUNK, MP, and ETH port aggregation
	PW redundancy, Ethernet OAM, and Y.1731
	BFD
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 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.

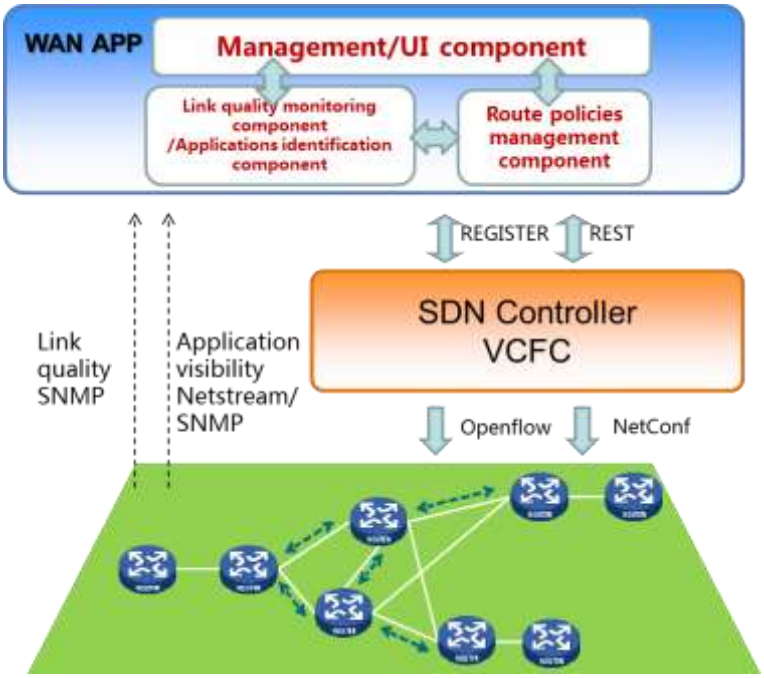
With BRAS, the CR16000-F router can provide unified access authentication for large numbers of wired and wireless users and meet requirements of wireless terminals for mobility and once-for-all authentication and rate. BRAS IRF stateful failover reduces the impact of single device failures on the network 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

PID	Description
CR16006-F	H3C CR16006-F core router chassis
CR16010-F	H3C CR16010-F core router chassis
CR16010H-F	H3C CR16010H-F core router chassis
CR16018-F	H3C CR16018-F core router chassis
Power module	
PSR2400-12D	DC 2400W power module
PSR2500-12A	AC 2500W power module
MPU module	
CSR05SRP1L1	H3C CR16000-F Management and Route Process Unit(1L1)
CSR05SRP1L3	H3C CR16000-F Management and Route Process Unit(1L3)
CSR05SRP1P1	H3C CR16000-F Main Processing Unit(1P1)
CSR05SRP1P3	H3C CR16000-F Main Processing Unit(1P3)
CSR05SRP1R3	H3C CR16000-F Main Processing Unit(1R3)
Switching fabric module	
CSFC-04B	H3C CR16006-F Switch Fabric Card(B Type)
CSFC-04D	H3C CR16006-F Switch Fabric Card(D Type)
CSFC-08B	H3C CR16010-F Switch Fabric Card(B Type)
CSFC-08D	H3C CR16010-F Switch Fabric Card(D Type)
CSFC-08E	H3C CR16010-F Fabric Module(E Type)
CSFC-08E1	H3C CR16010H-F Fabric Module(E Type)
CSFC-08T	H3C CR16010H-F Fabric Module(T Type)
CSFC-16E	H3C CR16018-F Fabric Module(E Type)
CSFC-16T	H3C CR16018-F Fabric Module(T Type)

Sec Module	
IM-MSUX	H3C CR16000-F Universal Line Processing Unit (IM-MSUX)
IM-MSEX-B	Service Processing Unit (IM-MSEX-B)
IM-SP-B	Universal Expansion Service Processing Module (IM-SP-B)
IM-SFMX	Network Data Encryption Service Processing Unit (IM-SFMX)
IO Module	
CEPC-XP4LX	H3C CR16000-F 4-port 10GBASE-R/W Ethernet Optical Interface Line Processing Unit Module (SFP+, LC)
CEPC-XP24LX	H3C CR16000-F 24-Port 10GBASE-R/W Ethernet Optical Interface Line Processing Unit (SFP+, LC)
CEPC-XP48RX	H3C CR16000-F 48-Port 10GBASE-R/W Ethernet Optical Interface Module (SFP+, LC)
CEPC-CP4RX	H3C CR16000-F 4-Port 100GBASE Ethernet Optical Interface Module (CFP2)
CEPC-CP4RX-L	H3C CR16000-F 4-port 100G Ethernet Optical Interface Line Processing Unit (QSFP28, LC)
CEPC-CQ8L	H3C CR16000-F 8-Port 100G Ethernet Optical Interface Line Processing Unit(QSFP28,LC)
CEPC-CQ16L1	H3C CR16000-F 16-Port 100G Ethernet Optical Interface Line Processing Unit (QSFP28,LC)
CEPC-CDQ2L	H3C CR16000-F 2-Port 400G Ethernet Optical Interface Line Processing Unit(QSFP28-DD,LC)
Service Engine module	
CSPEX-1304X	H3C CR16000-F Service Processing Unit(1304X)
CSPEX-1404X	H3C CR16000-F 4-Port Multi-Service Processing Engine1404X
CSPEX-1504X	H3C CR16000-F 4-Port Multi-Service Processing Engine1504X
CSPEX-1602X	H3C CR16000-F Service Processing Unit(1602X)
CSPEX-1802X	H3C CR16000-F Service Processing Unit(1802X)
CSPEX-1804X	H3C CR16000-F Service Processing Unit(1804X)
CSPEX-1512X	H3C CR16000-F Service Processing Unit(1512X)
CSPEX-1612X	H3C CR16000-F Service Processing Unit(1612X)
CSPEX-1812X	H3C CR16000-F Service Processing Unit(1812X)
CSPEX-2304X-G	H3C CR16000-F Service Processing Unit (2304X-G)
Sub-card module	
MIC-GP4L	H3C CR16000-F 4-Port 1000BASE-X/1000BASE-T Combo Interface Card
MIC-GP10L-V2	H3C CR16000-F 10-Port 1000BASE-X Ethernet Optical Interface Card(SFP,LC)
MIC-GP20L	H3C CR16000-F 20-Port 1000BASE-X Ethernet Optical Interface Card,(SFP,LC)
MIC-GT20L	H3C CR16000-F 20-Port 1000BASE-X Ethernet Electrical Interface Card(RJ45)
MIC-XP2L-LAN	H3C CR16000-F 2-port 10GBASE-R Ethernet Optical Interface Card(SFP+,LC)-LAN
MIC-XP2L	H3C CR16000-F 2-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
MIC-XP4L1	H3C CR16000-F 4-port 10GBASE-R/W Ethernet Optical Interface Card 1(SFP+,LC)
MIC-XP5L1	H3C CR16000-F 5-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
MIC-QP1L	H3C CR16000-F 1-port 40G Ethernet Optical Interface Card(QSFP+,LC)
MIC-CP1L	H3C CR16000-F 1-Port 100G Optical Interface Card,(CFP,LC)
MIC-XP20L	H3C CR16000-F 20-port 10GBASE-R/W Ethernet Optical Interface Card(SFP+,LC)
MIC-CP2L	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(CFP2,LC)
MIC-CQ2L	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(QSFP28)
MIC-CP1L-V2	H3C CR16000-F 1-port 100G Ethernet Optical Interface Card(CFP2,LC)
MIC-CP2L-V2	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card(QSFP28)

MIC-CLP2L	H3C CR16000-F 2-Port OC-3/STM-1 Channelized POS Optical Interface Card, (SFP, LC)
MIC-CLP4L	H3C CR16000-F 4-Port OC-3/STM-1 Channelized POS Optical Interface Card, (SFP, LC)
MIC-ET16L	H3C CR16000-F 16-Port E1 Electrical Interface Card (HM96 Male Connector)
MIC-CQ1L1	H3C CR16000-F 1-port 100G Ethernet Optical Interface Card (QSFP28)
MIC-GT20L1	H3C CR16000-F 20-Port 1000BASE-T Ethernet Copper Interface Card (RJ45)
MIC-GP10L2	H3C CR16000-F 10-Port 1000BASE-X Ethernet Optical Interface Card (SFP, LC)
MIC-CQ1L2	H3C CR16000-F 1-Port 100G Ethernet Optical Interface Card 2 (QSFP28, LC)
MIC-XP10L-LAN	H3C CR16000-F 10-Port 10GBASE-R Ethernet Optical Interface Card (SFP+, LC)-LAN
NIC-CC2L	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card (CFP2, LC) (NIC)
NIC-GP20L	H3C CR16000-F 20-port 1000BASE-X Ethernet Optical Interface Card (SFP, LC) (NIC)
NIC-XP20L	H3C CR16000-F 20-port 10GBASE-R/W Ethernet Optical Interface Card (SFP+, LC) (NIC)
NIC-CC1L	H3C CR16000-F 1-port 100G Ethernet Optical Interface Card (CFP2, LC) (NIC)
NIC-XP5L	H3C CR16000-F 5-port 10GBASE-R/W Ethernet Optical Interface Card (SFP+, LC) (NIC)
NIC-XP10L	H3C CR16000-F 10-port 10GBASE-R/W Ethernet Optical Interface Card (SFP+, LC) (NIC)
NIC-CQ1L	H3C CR16000-F 1-port 100G Ethernet Optical Interface Card (QSFP28) (NIC)
NIC-GP24L	H3C CR16000-F 24-port 1000BASE-X Ethernet Optical Interface Card (SFP, LC) (NIC)
NIC-GP24L1	H3C CR16000-F 24-Port 1000BASE-X Ethernet Optical Interface Card (SFP, LC) (NIC)
NIC-CQ2L	H3C CR16000-F 2-port 100G Ethernet Optical Interface Card (QSFP28) (NIC)
RX-NIC-YGS4L	H3C CR16000-F 4-port 25G Ethernet Optical Interface Card (SFP28, LC) (RX-NIC)
RX-NIC-LGQ2L	H3C CR16000-F 2-port 50G Ethernet Optical Interface Card (QSFP28, LC) (RX-NIC)
RX-NIC-LGQ4L	H3C CR16000-F 4-port 50G Ethernet Optical Interface Card (QSFP28, LC) (RX-NIC)
RX-NIC-CQ1LF	H3C CR16000-F 1-port 100G Flexible Ethernet Optical Interface Card (QSFP28, LC) (RX-NIC)

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