

H3C Multiple Service Routers-MSR 50

Product Overview

Multiple Service Routers (MSR) series is a brand new product portfolio of Huawei-3com oriented to multi-service applications, delivering wire speed and concurrent services of data, voice and video. To meet various demands of different industries, Multiple Service Routers series provides customers with unique experience of network flexibility and agility. Bearing innovative and forecasting concept on mind, MSR integrates adaptive services into a single platform with high security and reliability, thus lowering network cost and uncertainty.

MSR adopts optimized hardware and software structure to guarantee embedded security and significant performance while providing the services covering Voice over IP (VoIP), business video and network analysis etc. By supporting more types of modules, MSR features higher interface density and more services availability. Considering future network expansion and versatile network applications, MSR opens interfaces to third party in according to the standard of Open Application Architecture (OAA). In addition, MSR adopts the most advanced COMWARE V5 software platform, providing abundant mainstream functions such as IPv6, MPLS TE etc.

With newly developed modules of high performance and fully compatible with interface modules of AR 28 and AR 46, Multiple Service Routers series gives more modern and novel applications while protecting users' investment in an all-round way. Currently, MSR comprises eight products in three levels of MSR 20, MSR 30 and MSR 50, meeting the demands of small and medium sized enterprises to large scale corporations in every industry.

MSR 50 series serves as the flagship product line of MSR series, which comprises two products of MSR 50-40 and MSR 50-60. As multiple service routers oriented to mid to large enterprises, MSR 50 delivers secure, fast and concurrent services to meet various applications. With embedded hardware-based encryption chip, MSR 50 greatly improves the security performance. In addition, MSR 50 supports four types of abundant service modules, the DSIC (Double-width SIC) and DFIC (Double width FIC) of which help to realize convergence of routing and switching on a unified platform. Furthermore, with scalable voice processing modules and open application architecture, MSR 50 gives much flexibility while protecting users' investment. The products of MSR 50 are displayed as follows:



H3C MSR50-40 Front View



H3C MSR 50-40 Rear View



H3C MSR50-60 Front View



H3C MSR 50-60 Rear View

Figure 1 MSR 50 Series Multiple Service Routers

Features & Benefits

Advanced Hardware Architecture

- Embedded Service Modules for Security and Voice

MSR 50 series routers adopt brand new hardware structure to support enhanced security and voice functions. By using embedded modules of VCPM (Voice Co-Processing Module) and VPM (Voice Processing Module), the voice function has been greatly improved. VCPM achieves local TDM (Time Division Multiplexing) while VPM serves as a Digital Signal Processor (DSP) to provide voice communication. The voice module supports mainstream voice protocols such as SIP, H.323 etc. Moreover, different VPMs are available in according to the number of supported telephone lines. Therefore, it is quite flexible for the users to configure voice functions, thus, reducing the investment. For security, embedded hardware encryption modules are provided. MSR 50 supports two types of encryption card for users to select. They are SNDE (Standard Network Data Encryption) card and ANDE (Advance Network Data Encryption) card.

- CF Card & USB Interface

Considering security and future application, MSR 50 series routers adopt Compact Flash (CF) card and Universal Serial Bus (USB) interface. CF card is used to replace built-in FLASH. CF card features high speed, large capacity, light weight, low power consumption, easy upgrade etc. USB is a universal standard interface, with which routers will enjoy many powerful functions. MSR 50 support USB

memory disk to download and upload configuration files. In the future, MSR 50 will support e-token and other more advanced and practical applications such as USB console, wireless functions etc.

Brand New Software Architecture

MSR 50 Series Routers adopt the Comware V5 network operating platform, on which MSR 50 products fully support the previous software features of the AR 18/28/46 Series, e.g. providing abundant network security features, supporting the Systems Network Architecture (SNA)/Data-Link Switching (DLSw) etc. In addition, this unified platform provides the backup solution based on the backup center technology and VRRP, supports MPLS L3/L2 VPN and ADSL access, PPPoE Server/Client and IP multicast and offers abundant Quality of Service (QoS) features. Meanwhile, the Comware V5 operating platform supports IPv6, MPLS TE and other abundant features.

- IPv6

By using Comware V5 software platform, MSR 50 supports the cutting edge technology of IPv6. As a fundamental of the next-generation network, IPv6 is widely recognized with its striking technical advantages. Major IPv6 features of MSR 50 Series Routers include:

- Support the IPv6 addresses
- Support IPv6 Neighbor Discovery
- Support IPv6 Path MTU
- Support the IPv6 ACL
- Support the IPv6 routing protocols
- Support evolution from IPv4 to IPv6
- NAT-PT (Network Address Translation-Protocol Translation)
- Packet and message translation
- IPv6-IPv4 tunnel

- MPLS TE

MPLS TE is a QoS technology based on the Int-Serv model. By integrating the traffic engineering and MPLS technologies, it can establish the LSP tunnel to a specified path, make resources reservation and enable the network traffic to bypass the congestion nodes, thus balancing the network traffic. Therefore, MSR 50 Series Routers make more flexible use of the QoS technology in the MPLS network.

- Powerful Forwarding Performance & Encryption Capacity

The IP packet forwarding performance is a key parameter for evaluating a router. MSR 50 Series Routers adopt advanced technologies to ensure rapid forwarding in the multiple concurrent services situation. MSR 50 Series Routers not only provide fast forwarding on various high-speed link interfaces, but forward packets rapidly in collaboration with the QoS and firewall functions. MSR 50 series routers use ESM (Enhanced Service Module) security module to improve encryption performance. ESM is a built-in card, which doesn't occupy service slot.

Multi-Service Integration & Concurrency

For enterprises of different sizes, MSR30 Series Routers can be used to build the network that integrates data, voice and VoIP services on a single platform. The single platform offers a higher integrated density of data and voice, developing the enterprise IP voice application into a new stage. Compared with the routers of the same level, MSR 30 Series Routers improve dramatically in terms of the forwarding performance, security performance and voice performance.

- Voice Services

MSR 50 Series Routers support the mainstream VoIP protocols such as SIP, H.323 etc. By adopting scalable embedded voice processing modules, MSR 20 provides high density multiple interface modules for the VoIP applications, such as FXS/FXO/ISDN BRI voice, E1/T1 digital voice etc.

- Complete Convergence of Routing and Switching

The newly developed modules support high density switching. In particular, the MSR 50 series supports the 4/9-port SIC switching modules, 16-port FIC switching module and 24-port DFIC switching module. These Ethernet switching modules support relatively sound L2 Ethernet switch features and relevant protocols, for instance, VLAN, MAC address management, STP, port trunking LACP, 802.1X, QOS/ACL etc.

- Comprehensive VPN and Security Features:

In addition to the traditional VPN and security features such as L2TP VPN, GRE VPN, RADIUS, ASPF (Application Specific Packet Filtering), Portal etc, the Comware V5 software platform further expands and improves VPN and security features such as Firewall, IPSec VPN, MPLS VPN, CA, Secure Shell (SSH) protocol 2.0, intrusion protection, Simple Network Management Protocol (SNMP v3) etc.

- Open Application Architecture:

In addition to meeting current service demands of various users, MSR 30 series provides flexible means to extend services and protect users' investments by adopting Open Application Architecture. OAA helps users to develop a variety of value-added services on this platform, enriching the network applications by opening interfaces to third party and achieving the win-win strategy.

Investment Protection

In addition to meeting current service demands of various users, MSR 30 series provides flexible means to extend services and protect users' investments by adopting Open Application Architecture. OAA helps users to develop a variety of value-added services on this platform, enriching the network applications by opening interfaces to third party and achieving the win-win strategy.

High Reliability

The MSR 50 Series Routers provide the Backup Center and VRRP technologies, ensuring the provision of the backup scheme in case of communication line failure or equipment failure. In this way,

smooth data communication is ensured and the robustness, reliability of the network is enhanced. The backup center supports the backup load sharing function.

Easy maintenance and efficient deployment

MSR 50 series routers provide more customized management solutions.

- **Auto-config** can automatically detect and configure all its interfaces upon its first use and starts Telnet, FTP, or Web service.
- **Easy Deployment:** Based on Auto-config and Serial Number for each router, MSR 50 can realize the branch devices zero-touch and centralized management by the central management system.
- **Configuration Rollback:** If any error occurs during the configuration deploying process, the device will inform the NMS and the configuration file will get rollback, which ensures the reliability of configuration deployment.
- **NetStream** can provide the packet statistics function. It differentiates traffic flows through the destination IP address, source IP address, destination port Number, source port Number, protocol ID, ToS, input/output interface of packets and makes independent data statistics for different flows.
- **NQA** delivers network quality and analysis function, detecting the state and service type of DLSw, DHCP, FTP, HTTP or SNMP servers, realizing the service status monitoring and network quality analysis.

Specifications

Table 1 Hardware Specification

Item	MSR 50-40	MSR 50-60
Number of Fixed Ethernet ports	2 GE Combo	2 GE Combo
Module slot	4 SIC slots 4 FIC slots	4 SIC slots 6 FIC slots
ESM slot	2	2
VPM slot	4	4
Fixed USB(USB1.1) ports	2	2
AUX	1	1
Console	1	1
VCPM slot	1	1
Hardware encryption	Support (SNDE,ANDE)	Support (SNDE,ANDE)
IP Forward Performance(pps)	600K	600K
DDR memory capacity (Default/Maximum)	512MB/1G (DDR)	512MB/1G (DDR)
CF (default/maximum)	256MB/256MB	256MB/256MB

Output Power(Maximum)	350W	350W
AC input voltage	100 to 240 VAC	100 to 240 VAC
Frequency	50-60 Hz	50-60 Hz
DC input voltage	-48 VDC to -60 VDC	-48 VDC to -60 VDC
Outline dimension (mm) (WxDxH)	436x421x130.6mm	436x421x175mm
Weight	16kg	21kg
Environment temperature	32 to 104°F (0 to 40°C)	
Environment relative humidity	5 ~ 90% (Noncondensing)	
EMC	ETSI EN 300 386 V1.3.1 (2001-09) EN 55022(1998) EN 55024 (1998) FCC Part15 ICES-003 VCCI V-3 AZ/NZS CISPR22 CNS 13438	
Security specification	UL 60950 3rd Edition CSA 22.2#950 3rd Edition 1995 EN 60950: 2000 + ZB & ZC deviations for European Union LVD Directive IEC 60950:1999 + corr. Feb. 2000, modified + all National deviations	

Table2 Software Specification

Item	Description
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Item	Description	
Network interconnection	LAN protocol	<ul style="list-style-type: none"> • ARP (agent ARP, free ARP and authorization ARP) • Ethernet_II • Ethernet_SNAP • VLAN (PORT-BASED VLAN/MAC-BASED VLAN/VLAN-BASED PORT ISOLATE/VLAN VPN/VOICE VLAN) • 802.3x • LACP (802.3ad) • 802.1p • 802.1Q • 802.1x • RSTP (802.1w) • MSTP (802.1s) • IGMP Snooping • GVRP • PORT LOOPBACK • PORT MUTILCAST suppression
	WAN protocol	<ul style="list-style-type: none"> • PPP and MP • PPPoE Client and PPPoE Server • PPP/MP over FR • FR and MFR • FR Fragment, FR Compress and FR over IP • FRTS • ATM (IPA, IPoEoA, PPPoA and PPPoEoA) • DCC and Dialer Watch • HDLC • LAPB • X25, X25 over TCP, X25 to TCP • X25 PAD, X25 Huntgroup and X25 CUG • DLSW (V1.0/2.0) • ISDN and ISDN Network • ISDN QSIG • MODEM

Item	Description	
Network protocol	IP service	<ul style="list-style-type: none"> • Fast forwarding (unicast/multicast) • TCP • UDP • IP Option • IP unnumber • Policy routing (unicast/multicast)
	Non-IP service	<ul style="list-style-type: none"> • SNA/DLSw • DLSw Ethernet redundant backup • IPX • SOT • Netstream
	IP application	<ul style="list-style-type: none"> • Ping, Trace • DHCP Server • DHCP Relay • DHCP Client • DNS client • DNS Static • NQA • IP Accounting • UDP Helper • NTP • Telnet • TFTP Client • FTP Client • FTP Server
	IP routing	<ul style="list-style-type: none"> • Static routing management • Dynamic routing protocol <li style="padding-left: 20px;">RIP/RIPng <li style="padding-left: 20px;">OSPF <li style="padding-left: 20px;">OSPFv3 <li style="padding-left: 20px;">BGP <li style="padding-left: 20px;">IS-IS • Multicast routing protocol <li style="padding-left: 20px;">IGMP <li style="padding-left: 20px;">PIM-DM <li style="padding-left: 20px;">PIM-SM <li style="padding-left: 20px;">MBGP <li style="padding-left: 20px;">MSDP • Routing policy

Item	Description	
	MPLS	<ul style="list-style-type: none"> • LDP • LSPM • MPLS TE • MPLS FW • MPLS/BGP VPN • L2VPN
	IPv6	<p>Basic IPv6 functions</p> <ul style="list-style-type: none"> • IPv6 ND • IPv6 PMTU • IPv6 FIB • IPv6 ACL <p>IPv6 transition technology</p> <ul style="list-style-type: none"> • NAT-PT • IPv6 tunnel • 6PE <p>IPv6 routing</p> <ul style="list-style-type: none"> • IPv6 static routing management <p>Dynamic routing protocol</p> <ul style="list-style-type: none"> • RIPng • OSPFv3 • IS-ISv6 • BGP4+ <p>Multicast routing protocol</p> <ul style="list-style-type: none"> • MLD • PIM-DM • PIM-SM • PIM-SSM
Network security	Port security	<ul style="list-style-type: none"> • PPPoE Client & Server • PORTAL • 802.1x
	AAA	<ul style="list-style-type: none"> • Local authentication • Radius • HWTACACS
	Firewall	<ul style="list-style-type: none"> • ASPF • ACL • FILTER
	Data security	<ul style="list-style-type: none"> • IKE • IPsec • Encryption card • Portal

Item	Description	
	Others	<ul style="list-style-type: none"> • L2TP • NAT/NAPT • PKI • RSA • SSH V1.5/2.0 • SSL • URPF • GRE
Reliability	<ul style="list-style-type: none"> • VRRP • Backup center 	
QOS	Layer QoS	<ul style="list-style-type: none"> • SP • WRED (Port) • CAR • LR • Flow-base QoS Policy • Port-Based Mirroring • Flow-Based Mirroring • Cos-Based HOLB (Head of Line Blocking) Prevention • Packet Remarking • Flow Redirect • Flow Accounting • Priority Mapping • Port Trust Mode • Port Priority • Flow Filter • FlowControl&Backpressure • ACL
	Traffic policing	<ul style="list-style-type: none"> • CAR (Committed Access Rate) • LR (Line Rate)
	Congestion management	<ul style="list-style-type: none"> • FIFO, PQ, CQ, WFQ, CBQ and RTPQ
	Congestion avoidance	<ul style="list-style-type: none"> • WRED/RED
	Traffic shaping	<ul style="list-style-type: none"> • GTS (Generic Traffic Shaping)
	Other QoS technologies	<ul style="list-style-type: none"> • FR QoS • MPLS QoS • MP QoS/LFI • cRTP/IPHC • ATM QoS • Sub interface QoS

Item	Description	
Voice	Interface	<ul style="list-style-type: none"> • FXS • FXO • E&M • E1VI/T1VI
	Signaling	<ul style="list-style-type: none"> • R2 • DSS1 • Q.sig • Digital E&M
	H.323	<ul style="list-style-type: none"> • H.225 • H.245
	GK Client	<ul style="list-style-type: none"> • GK Client
	SIP	<ul style="list-style-type: none"> • SIP
	Codec	<ul style="list-style-type: none"> • G.711A law • G.711U law • G.723R53 • G.723R63 • G.729a • G.729R8
	Media Process	<ul style="list-style-type: none"> • RTP/cRTP • IPHC • Voice Backup
	FAX	<ul style="list-style-type: none"> • FAX
Others	<ul style="list-style-type: none"> • Voice RADIUS • VoFR 	

Item	Description	
Maintainability	Network management	<ul style="list-style-type: none"> • SNMP V1/V2c/V3 • MIB • SYSLOG • BIMS • RMON
	Local management	<ul style="list-style-type: none"> • Command line • File system • auto-config • Dual Image
	User access management	<ul style="list-style-type: none"> • Console port • AUX port • TTY port • Telnet (VTY) • SSH • FTP • X25 PAD • XMODEM

Networking Applications

Networking application I: Integrated networking solution of large and medium sized enterprises:

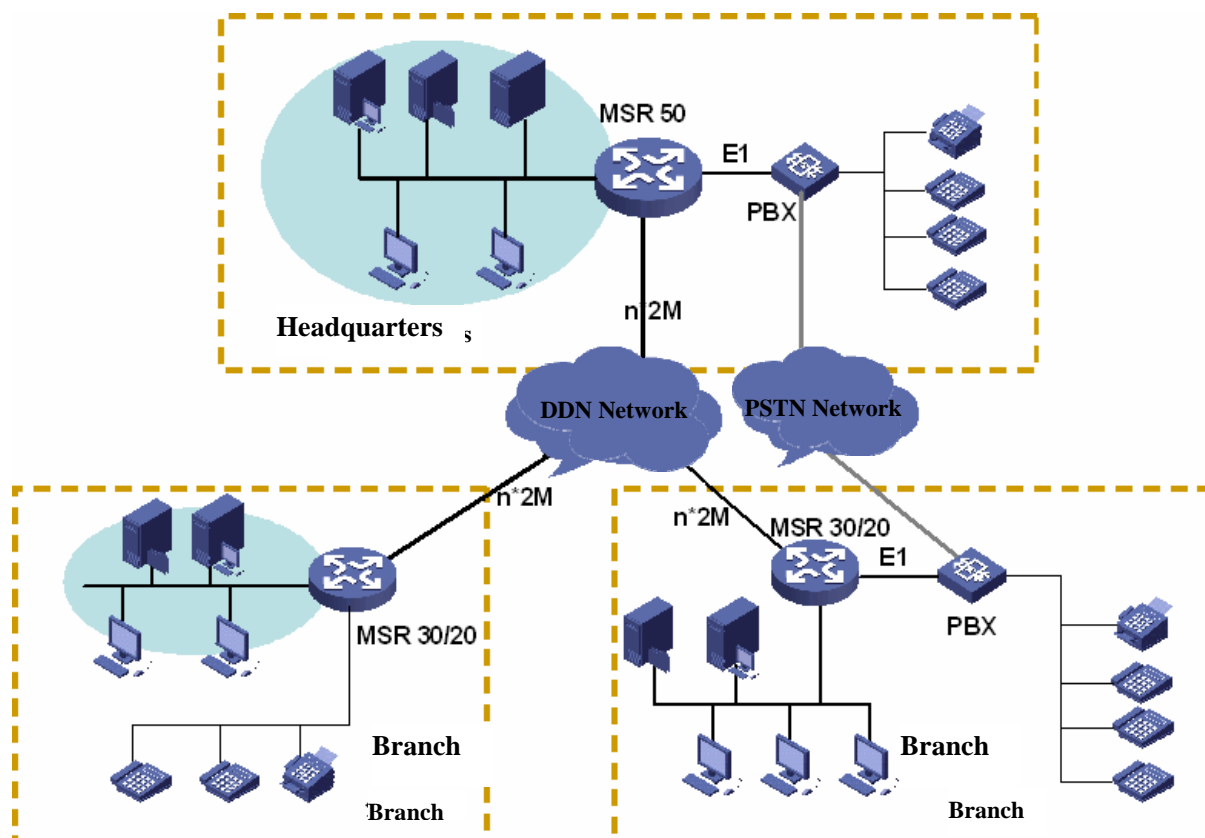


Figure 2: Integrated networking solution of large and medium sized enterprises

Medium and small sized enterprises may employ full series MSR 20, 30 and 50 routers to carry out the comprehensive service networking. MSR 50 series routers serve as enterprise center equipment and branches use MSR 20/30 series routers as access equipment and provide comprehensive services such as data, video, voice and fax. For large-sized enterprises, they can adopt NE series high-end and core routers and the subsidiary interfaces can use MSR 30/50 as edge and convergence layer access equipment.

- ✓ The headquarter employs H3C MSR 50 series routers, connects various branch networks via Ethernet, Digital Data Network (DDN), frame relay, X.25 or Synchronous Digital Hierarchy (SDH) network, and constructs the enterprise backbone network. Branches use H3C MSR 20/30 series routers to connect remote users via Ethernet and PSTN/ISDN, and provide access services to home office and mobile office users.
- ✓ MSR series routers provide such mainstream voice communication protocols such as SIP and H.323 to users, realize emergency call/power failure call/dial-up policy/fax/E-PHONE and other various voice services and include abundant voice interface types covering FXS/FXO/E1V1/T1V1/E&M. The series routers adopt an expandable architecture and DSP resource whole-system for unified allocation, improve the utilization of DSP resource greatly, enhance the access density and realize the TDM switching of local users. Consequently, the voice quality can be guaranteed.
- ✓ MSR series routers realize the convergence of routing and switching functions. Thus, users can use all features of routers and switches seamlessly.

Networking application II: MPLS VPN typical networking solution realized by MSR series routers

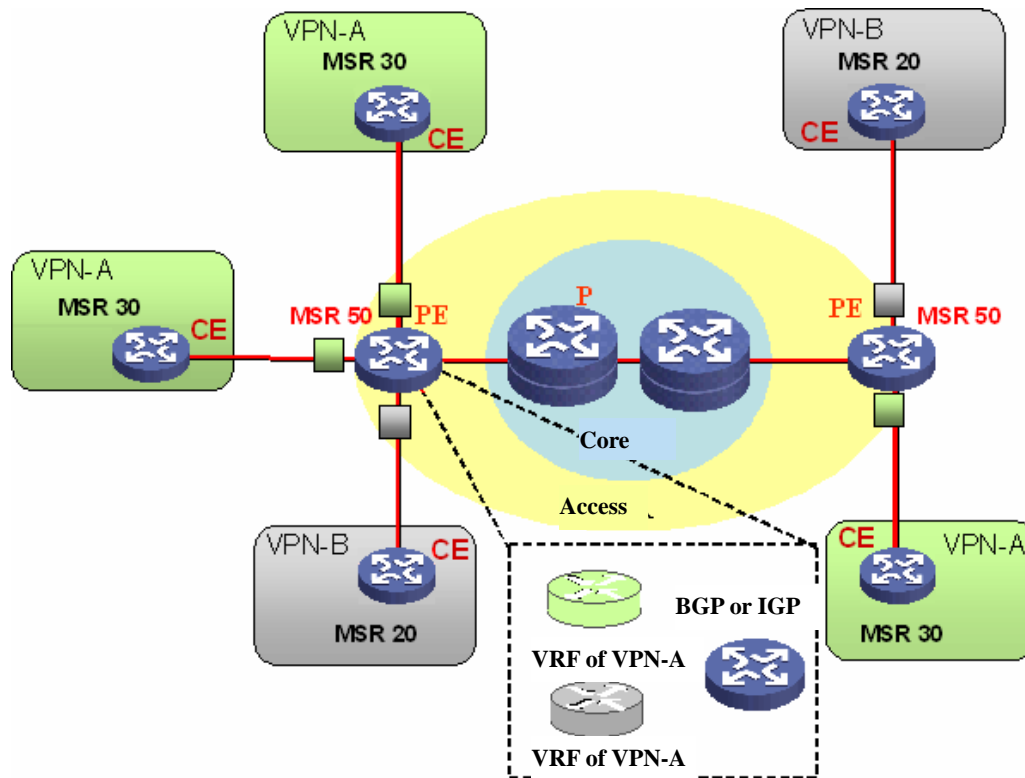


Figure 3: MPLS VPN Typical Networking Solution Realized by H3C MSR 20/30/50 Series Routers

MPLS is the latest development of the integrated routing/switching solution. It integrates the flexibility of IP routing technology with the simplicity and quickness of L2 switching, and shows the outstanding advantage in constructing VPN. MPLS network can realize very easily IP-based technology VPN services and satisfy the VPN expandability and management requirements. Security measures in MPLS VPN can be taken to ensure that different VPNs cannot visit mutually. MPLS network has a strong QoS mechanism that can provide service quality assurance to bandwidth, transmission quality and delay of VPN users.

- ✓ The core uses NE series high end and core router as P equipment. The convergence layer adopts MSR 50 series routers as PE equipment, accesses various service networks of branches. PE equipment divides various services into different VPN networks and ensures the security and reliability of services.
- ✓ Branches adopt MSR 20/30 equipment to connect the MSR 50 series equipment of the headquarter. Branches separate different services by using physical networks. In the case of multiple services in a physical network, VRF technology of MSR50 equipment can be used to realize the logical separation of various service networks.
- ✓ For MPLS VPN service, different modes are available to establish tunnels. Using MPLS TE tunnels to bear VPN service shows lots of advantages: give the sound security to VPN service and provide the reliable QoS assurance. In addition, operators can customize MPLS TE tunnels with different features in accordance with different service requirements of VPN users to meet the user requirements as much as possible.

- ✓ Provide MPLS VPN service of local networks and even cross-AS domain to users.
- ✓ All Sites in a VPN, which belong to an enterprise, are called Intranet. Sites in a VPN, which belong to different enterprises, are called Extranet. MSR series routers provide MPLS VPN access of Intranet and Extranet and give Internet egresses to users.
- ✓ As Provider Edge (PE) router, MSR 50 router can be connected directly with Customer Edge router of a user, and can complete all related processing of VPN and run the switching routing information among PEs. A PE can be connected with multiple CEs.
- ✓ MPLS VPN can realize the high forwarding speed and large-sized VPN network.

Networking application III: IPv6 Networking Application

MSR Series Routers support IPv6 and are compatible with IPv4 network, which is one of the highlighted features. By adopting the dual-stack technology, MSR Series Routers effectively ensure co-existence of the pure IPv4 devices and the pure IPv6 devices in the same network. The following is one of the networking diagrams for IPv6 application.

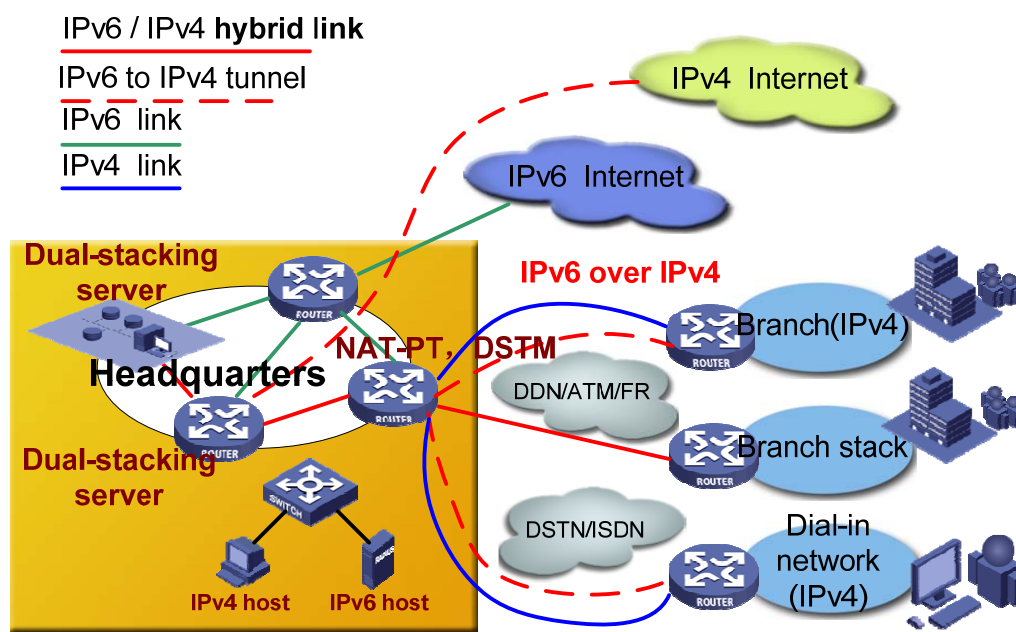


Figure 4 IPv6 Networking Application

The headquarters network uses MSR 50 Series Routers which adopt the IPv6/IPv4 dual-stack technology while the branches use the MSR 20/30 Series Routers. Networking can be conducted with the IPv4 technology alone or with the IPv6/IPv4 dual-stack technology. For network communications from IPv6 to IPv4, the tunneling technology can also be used, thus implementing seamless communications between the IPv6 and IPv4 networks.

Networking application IV: Security service networking application

The MSR Series Routers inherit all the security features of the previous VRP software platform. In addition, they support the feature of switching and routing convergence in Comware V5, and implement the safe VPN network for enterprises by using the existing Internet.

Enterprises can adopt the MSR 50 Series Routers as the corporate core devices, while the branches can adopt the MSR 20/30 Series Routers as the access devices. By combining the high-performance advantages of the MSR 30/50 routers, the high-quality, multi-service, integrated security network can be provided for the enterprise users.

The following is a typical security networking application of the MSR 30/MSR 50 routers.

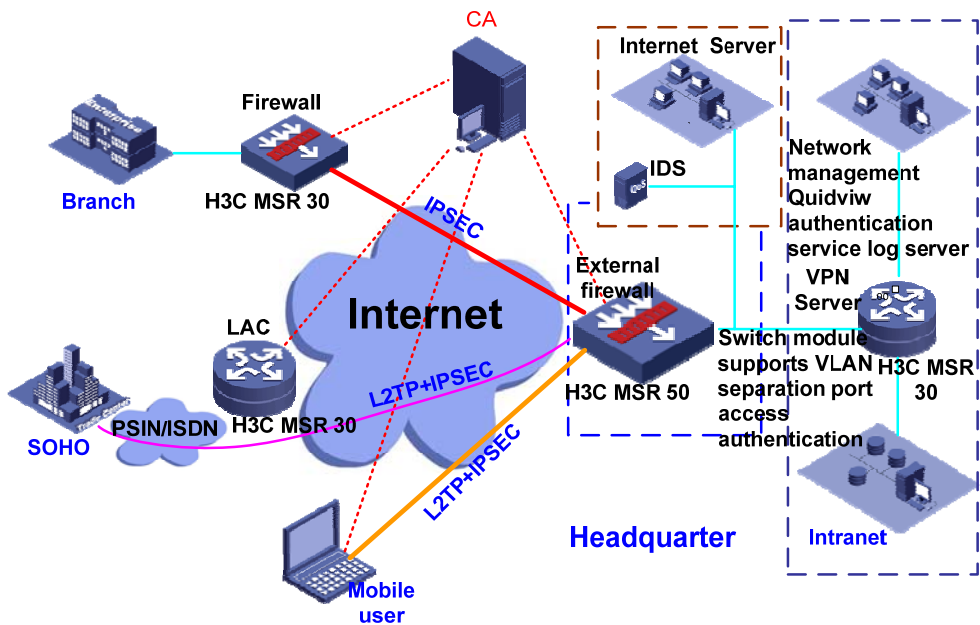


Figure 5 Networking diagram for security services

✓ In the enterprise headquarter; MSR50 routers are employed as the enterprise application security service gateway and external firewall to ensure the intranet security, together with the high performance security service. Meanwhile, switching modules are adopted, using the VLAN isolation and 8021.X function to implement the security access certification on the intranet users.

✓ In the enterprise branches, MSR30 routers are adopted as VPN and IPsec access link. Meanwhile, MSR30 routers are used as VPN access gateway and provide VPN access to SOHO and mobile employees.

Hosts and Modules

Table 3 Hosts and Modules supported on MSR 50

Name	Description
Main Host	
RT-MSR5040-AC-OVS-H3	H3C MSR 50-40 Router Chassis (w/One AC Power), 4FIC, Overseas Version
RT-MSR5060-AC-OVS-H3	H3C MSR 50-60 Router Chassis (w/One AC Power), 6FIC, Overseas Version

RT-MSR5040-DC-OVS-H3	H3C MSR 50-40 Router Chassis (w/One DC Power), 4FIC, Overseas Version
RT-MSR5060-DC-OVS-H3	H3C MSR 50-60 Router Chassis (w/One DC Power), 6FIC, Overseas Version
RT-MPUF-H3	H3C MSR 50 Main Processing Unit, 2GE, 4SIC, 256F/256D,
RT-MSCA-H3	H3C MSR 50 Multiple Service Module
RT-Z+M-25	H3C MSR 50-40 Security Bundle w/MPUF+MSCA+ANDE Modules, Overseas Version
RT-Z+M-23	H3C MSR 50-40 Voice Bundle w/MPUF+MSCA+VCPM+2*VPM32+SIC-1VE1 Modules, Overseas Version
RT-Z+M-27	H3C MSR 50-40 Secure Voice Bundle w/MPUF+MSCA+ANDE+VCPM+2*VPM32+SIC-1VE1 Modules, Overseas Version
RT-Z+M-26	H3C MSR 50-60 Security Bundle w/MPUF+MSCA+ANDE Modules, Overseas Version
RT-Z+M-24	H3C MSR 50-60 Voice Bundle w/MPUF+MSCA+VCPM+2*VPM32+SIC-1VE1 Modules, Overseas Version
RT-Z+M-28	H3C MSR 50-60 Secure Voice Bundle w/MPUF+MSCA+ANDE+VCPM+2*VPM32+SIC-1VE1 Modules, Overseas Version
AC-PSR350-A10-OVS-H3	Redundant AC Power for MSR50
DC-PSR350-D10-H3	Redundant DC Power for MSR50
Software Option 1	Comware V5 Base Version for MSR 50
Software Option 2	Comware V5 Standard Version for MSR 50
FIC Module	
RT-FIC-1VE1-H3	1-port E1 Voice FIC Interface Module
RT-FIC-1VT1-H3	1-port T1 Voice FIC Interface Module
RT-FIC-2VE1-H3	2-port E1 Voice FIC Interface Module
RT-FIC-2VT1-H3	2-port T1 Voice FIC Interface Module
RT-FIC-16FSW-H3	16-port 10/100 Ethernet Switch FIC Interface Module
RT-FIC-1FE-V2-H3	1-Port 10M/100M Ethernet Electrical Interface FIC Module(RJ45)
RT-FIC-2FE-V2-H3	2-Port 10M/100M Ethernet Electrical Interface FIC Module(RJ45)
RT-FIC-4FE-H3	4-Port 10M/100M Ethernet Electrical Interface FIC Module(RJ45)
RT-FIC-1GBE-V2-H3	1-Port 1000M Ethernet Electrical Interface FIC Module(RJ45)
RT-FIC-2GBE-V2-H3	2-Port 1000M Ethernet Electrical Interface FIC Module(RJ45)
RT-FIC-1GEF-V2-H3	1-port 1000BASE-X Optical Interface Module (SFP, LC)
RT-FIC-2GEF-V2-H3	2-port 1000BASE-X Optical Interface Module (SFP, LC)
RT-FIC-2SAE-V2-H3	2-port Enhanced Sync/Async Interface Module
RT-FIC-4SAE-V2-H3	4-port Enhanced Sync/Async Interface Module
RT-FIC-8SAE-V2-H3	8-port Enhanced Sync/Async Interface Module
RT-FIC-8ASE-V2-H3	8-port Asynchronous Serial Interface Module (RJ45)
RT-FIC-16ASE-V2-H3	16-port Asynchronous Serial Interface Module (RJ45)
RT-FIC-1E1-V3-H3	1-Port CE1/PRI Interface Module
RT-FIC-2E1-V3-H3	2-Port CE1/PRI Interface Module

RT-FIC-4E1-V3-H3	4-Port CE1/PRI Interface Module
RT-FIC-8E1(75)-V2-H3	8-port E1/CE1/PRI Module (75ohm)
RT-FIC-8E1(120)-V2-H3	8-port E1/CE1/PRI Module (120hm)
RT-FIC-1E1-F-V3-H3	1-port E1 Module-Fractional
RT-FIC-2E1-F-V3-H3	2-port E1 Module-Fractional
RT-FIC-4E1-F-V3-H3	4-port E1 Module-Fractional
RT-FIC-8E1(75)-F-V2-H3	8-port E1 Module-Fractional (75ohm)
RT-FIC-8E1(120)-F-V2-H3	8-port E1 Module-Fractional (120ohm)
RT-FIC-1T1-V3-H3	1-Port CT1/PRI Interface Module
RT-FIC-2T1-V3-H3	2-Port CT1/PRI Interface Module
RT-FIC-4T1-V3-H3	4-Port CT1/PRI Interface Module
RT-FIC-8T1-V2-H3	8-Port CT1/PRI Interface Module
RT-FIC-1T1-F-V3-H3	1-Port T1 & Fractional T1 Interface Module
RT-FIC-2T1-F-V3-H3	2-Port T1 & Fractional T1 Interface Module
RT-FIC-4T1-F-V3-H3	4-Port T1 & Fractional T1 Interface Module
RT-FIC-8T1-F-V2-H3	8-Port T1 & Fractional T1 Interface Module
RT-FIC-4BSE-V2-H3	4-Port Enhanced ISDN-S/T Interface FIC Module
RT-FIC-1CE3-V2-H3	1-port E3/CE3 Compatible Interface Module
RT-FIC-1CT3-V2-H3	1-port T3/CT3 Compatible Interface Module
RT-FIC-2FXS-V3-H3	2-port Analog Line Interface Module, FXS
RT-FIC-4FXS-V3-H3	4-port Analog Line Interface Module, FXS
RT-FIC-2FXO-V3-H3	2-port Analog Trunk Interface Module, FXO
RT-FIC-4FXO-V3-H3	4-port Analog Trunk Interface Module, FXO
RT-FIC-HNDE-V2-H3	High Performance Network Data Encryption FIC Module
RT-FIC-1POS-V2-H3	1-Port Packet over SDH/SONET Interface Module
RT-FIC-2EM-V2-H3	2-Port Analog Trunk Interface FIC Module (E&M)
RT-FIC-4EM-V2-H3	4-Port Analog Trunk Interface FIC Module (E&M)
RT-FIC-1G.SHDSL-V3-H3	1-Port G.SHDSL(ATM Mode) Interface FIC Module
RT-FIC-2G.SHDSL-V3-H3	2-Port G.SHDSL(ATM Mode) Interface FIC Module
RT-FIC-4G.SHDSL-V3-H3	4-Port G.SHDSL(ATM Mode) Interface FIC Module
RT-FIC-1ATM-OC3MM-V2-H3	1-Port OC-3 ATM FIC Module (Multi-Mode, SC, 2km)
RT-FIC-1ATM-OC3SML-V2-H3	1-Port OC-3 ATM FIC Module (Single Mode, SC, 30km)
RT-FIC-1ATM-OC3SM-V2-H3	1-Port OC-3 ATM FIC Module (Single Mode, SC, 15km)
RT-FIC-1AE3-V2-H3	1-Port ATM over E3 Interface FIC Module
RT-FIC-1AT3-V2-H3	1-Port ATM over T3 Interface FIC Module
DFIC Module	
RT-DFIC-24FSW-H3	24-port 10/100 Ethernet Switch FIC Interface Module (Double Width)
SIC Module	
RT-SIC-1ETH-H3	1-port 10BASE-T Interface Card
RT-SIC-1FEA-H3	1-port 10/100BASE-TX Ethernet Interface Card
RT-SIC-1GEC-H3	1-port Gigabit Ethernet SIC (Combo)

RT-SIC-4FSW H3	4-port 10/100 Ethernet Switch SIC Interface Module
RT-DSIC-9FSW-H3	9-port 10/100 Ethernet Switch SIC Interface Module (Double Width)
RT-SIC-1VE1-H3	1-port E1 Voice SIC Interface Module
RT-SIC-1VT1-H3	1-port T1 Voice SIC Interface Module
RT-SIC-1FXS-V2-H3	1-port Analog Trunk Interface Card, FXO-V2
RT-SIC-2FXS-V2-H3	2-port Analog Trunk Interface Card, FXO-V2
RT-SIC-1FXO-V2-H3	1-port Analog Line Interface Card, FXS-V2
RT-SIC-2FXO-V2-H3	2-port Analog Line Interface Card, FXS-V2
RT-SIC-1SAE H3	1-port Enhanced Sync/Async Interface Card
RT-SIC-EPRI-H3	1-port E1/CE1/PRI Interface Card
RT-SIC-1E1-F-H3	1-port E1 Interface Card-Fractional
RT-SIC-TPRI-V2-H3	1-port T1/CT1/PRI Interface Card
RT-SIC-1T1-F-V2-H3	1-port T1 & Fractional T1 Interface Module
RT-SIC-1ADSL-I-H3	1-Port ADSL over ISDN Interface Module
RT-SIC-1ADSL-H3	1-Port ADSL over POTS Interface Module
RT-SIC-1AM-V3-H3	1-Port Analog Modem Interface Module
RT-SIC-2AM-V3-H3	2-Port Analog Modem Interface Module
Embedded Security & Voice Module	
RT-ESM-ANDE-H3	Advanced Network Data Encryption ESM Module
RT-ESM-SNDE-H3	Standard Network Data Encryption ESM Module
RT-VCPM-H3	Voice Co-processing Module
RT-VPM32-H3	32-Channel Voice Processing Module
RT-VPM24-H3	24-Channel Voice Processing Module
RT-VPM16-H3	16-Channel Voice Processing Module
RT-VPM8-H3	8-Channel Voice Processing Module

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