

**Quidway[®] AR28 Series Intelligent Multi-Services
Modular Branch Routers Datasheet**



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1 Quidway AR 28-09

1.1 Product Introduction

Quidway AR 28-09 Intelligent Multi-Services Modular Branch Router is a border access router, providing not only integrated Fast Ethernet interfaces (FE), AUX port and synchronous/asynchronous serial interfaces, but also abundant optional SICs (Smart Interface Cards) and MIMs (Multifunction Interface Modules). Quidway AR 28-09 Modular Router features higher cost effectiveness and better expandability comparing with the similar products. Therefore, it can serve as the access router in remote branches. Latest xDSL technology is also adopted to meet the trend of broadband IP network.



Figure 1-1 Figure 1 Quidway AR28-09 Front View



Figure 1-2 Figure 2 Quidway AR28-09 Rear View



1.2 Key benefits

1.2.1 Cost-effective Flexibility and Expansibility

Quidway AR 28-09 Intelligent Multi-Services Modular Branch Router provides 2 SIC slots and 1 MIM slot. Users can flexibly deploy remote access networks and satisfy the requirements of the future changes by means of changing or expanding interface cards and modules. Existing investment will be maximally protected.

1.2.2 Data Security & Reliability

Supports AAA (authentication, authorization and accounting) services. Supports identification authentication protocols such as PAP, CHAP and RADIUS. Implements packet filtering and firewall technology, which prevent the illegal access from outside network. Hardware IPSec encryption can be applied to VPN tunnels to enhance the security of the user's private network in the Internet. Provides the backup solution based on the backup center and supports VRRP.

1.2.3 Constructing VPN

Intranet VPN interconnects distributed points of the Intranet through the public network so as to serve as the extension or replacement form of the traditional Defense Data Network (DDN) or other Intranets. Extranet VPN extends the Intranets to the partners or the clients, so as to enable different enterprises to conduct secure and private communications to one another through the public network. Supporting SNA

The router supports DLSw, implements crossing-WAN transmission of SNA and interconnection between LANs and SDLCs, providing integrated solution for the bank system.

1.3 Specifications

1.3.1 Product features

Table 1-1 Software Specifications of Quidway AR 28-09 Intelligent Multi-Services Modular Branch Router

Network Interconnection Protocol	Ethernet, PPP, PPPoE, SLIP, FR, LAPB, X.25, ISDN, HDLC, DCC, MODEM, MP
Network Layer Protocol and Application	IP, DLSw, IP Fast Switch, DHCP Client / Server / Relay, IPX, Auto-install
Routing Protocol	Static Routing, OSPF, RIPv1 / v2,



	BGP-4,IS-IS, Policy Routing, IGMP,MSDP,PIM-DM,PIM-SM, MBGP
Multiprotocol Label switching	MPLS,
Transmission layer protocol	TCP, UDP
Application Layer Protocol and Application	Telnet, Dumb Terminal, Terminal Server, FTP, TFTP, Callback, Configuration function, SNMP, RMON, Private MIBs, POS, RTU
Security Characteristics	AAA RADIUS, SSH, Firewall, NAT, L2TP, GRE, IPsec, IKE , Hardware Encryption card, Huawei-TACACS, RSA, CA
Voice Application	VOIP, VOFR, IP Fax, IPHC, GK Client, E1 Voice, T1 Voice, H.323, SIP
QoS Application	PQ, CQ, WFQ, CBWFQ, CAR, GTS, WRED, LR
Reliability Functions	VRRP, Backup Center

1.3.2 Hardware

Table 1-2 Hardware Specifications of Quidway AR 28-09 Intelligent Multi-Services Modular Branch Router

Description	Specification
Module Slots	2 SIC Slots (Up to 2 SICs can be configured as needed) 1 MIM Slot (Up to 1 MIM can be configured as needed)
Fixed Interfaces	1 10/100Mbps Ethernet Interface 1 Synchronous/Asynchronous Serial Interface 1 AUX Port 1 Console Port
Boot ROM memory	512KB
Default SDRAM	128MB



Maximum SDRAM	128MB
Flash	32MB
Forwarding Rate	70Kpps
Dimensions(W X H X D)	376.2 X 79.4 X 287.9 mm (including the rubber feet)
Weight	2.5kg
Input Voltage	AC:100V to 240V 50/60Hz
Maximum Power	50W
Operating Temperature	0 to 40°C
Operating Humidity	10 to 90%, non-condensing

2 Quidway AR 28-10/11/12/13/14

2.1 Product Introduction

Adopting the modular structure, high speed CPU technology and fast routing policy, Quidway AR 28-1X Routers provide abundant service interfaces to meet the requirements of such leased line services as DDN, packet-switched network and Frame Relay, and to satisfy the networking requirements of such dial-up line services as PSTN and ISDN. Latest xDSL technology is also adopted to meet the trend of broadband IP network.

Quidway AR 28-1X Routers can be used as the core routers for SME and industrial users to provide secure and reliable network solutions in combination with other Huawei network products.

Each such router provides two SIC slots and one MIM slot. Moreover, Quidway AR 28-10 router provides an fixed 10/100 Mbps Ethernet interface, an AUX port and one synchronous/asynchronous serial interface, AR 28-11 router provides two fixed 10/100 Mbps Ethernet interfaces, an AUX port and one synchronous/asynchronous serial interface, AR 28-12 router provides two synchronous/asynchronous serial ports, an AUX port, and two fixed 10/100 Mbps Ethernet interfaces. AR 28-13 router provides one CE1 port, an AUX port, and two fixed 10/100 Mbps Ethernet interfaces. AR 28-14 router provides one CT1 port, an AUX port, and two fixed 10/100 Mbps Ethernet interfaces.



Figure 2-1 Quidway AR 28-10 Front View



Figure 2-2 Quidway AR 28-10 Rear View



Figure 2-3 Quidway AR 28-11 Front View



Figure 2-4 Quidway AR 28-11 Rear View



Figure 2-5 Quidway AR 28-12 Front View



Figure 2-6 Quidway AR 28-12 Rear View

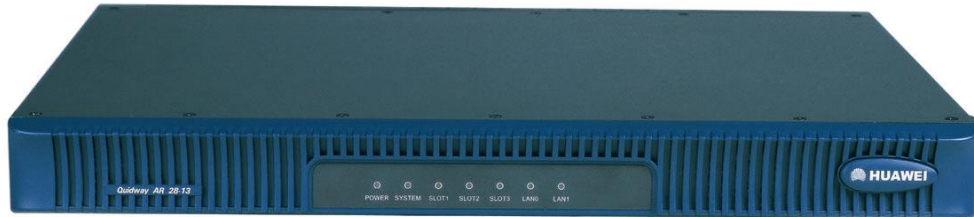


Figure 2-7 Quidway AR 28-13 Front View



Figure 2-8 Quidway AR 28-13 Rear View

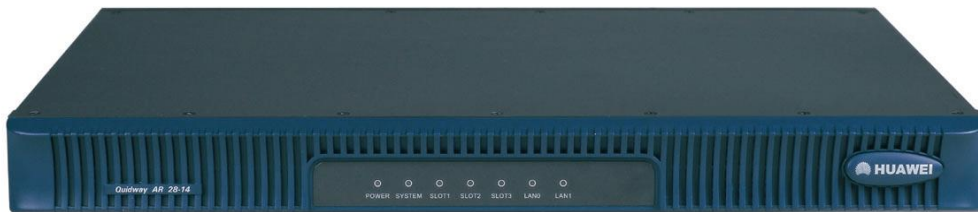


Figure 2-9 Quidway AR 28-14 Front View



Figure 2-10 Quidway AR 28-14 Rear View

2.2 Key benefits

2.2.1 Abundant Interface Types

Quidway AR 28-1X Routers support many different service interfaces, including synchronous serial interface, asynchronous serial interface, FE, E1/T1/PRI, ISDN BRI, E3/T3, FXS, FXO, E&M, E1VI, T1VI, ATM, ADSL, and so on. They also fully meet various networking requirements of DDN, Frame Relay, X.25, PSTN, ISDN, ATM, etc.

2.2.2 Perfect Security Protecting System

Quidway AR 28-1X Routers provide comprehensive security solutions. The security solution contains: packet filtering firewall, network address translation (NAT), Authentication, Authorization and Accounting (AAA), VPN, Call Back service, log administration, and so on.

2.2.3 Constructing VPN

Intranet VPN interconnects distributed points of the Intranet through the public network so as to serve as the extension or replacement of the traditional leased line network or other Intranets. Access VPN helps set up secure channels for small size users such as SOHO to access the resources of the company headquarters through PSTN/ISDN. Extranet VPN extends the Intranets to the partners or the clients, so as to enable different Intranets to conduct secure and private communications to each other through the public network. Quidway AR 28-1X routers mainly serves as LNS (L2TP Network Server).

2.2.4 Integrated Voice Solutions

Quidway AR 28-1X Routers are key components of our integrated voice over packet solutions, which include a rich family of Voice Gateway, GK and billing systems. Quidway AR 28-1X Routers deliver high quality and density VoIP and VoFR services to enterprises. By supporting standard H.323 and SIP protocols, Huawei integrated voice over packet solutions can inter-operate with other mainstream manufacturers' equipments.



2.3 Specifications

2.3.1 Product features

Table 2-1 Software Specifications of Quidway AR 28-1x Series Routers

Network Interconnection Protocol		Ethernet, PPP, PPPoE, SLIP, FR,LAPB, X.25, ISDN, HDLC, DCC, MODEM, MP
Network Layer Protocol and Application		IP, DLSw, IP Fast Switch, DHCP Client/Server/Relay, IPX , Auto-install
Routing Protocol		Static Routing, OSPF, RIPv1/v2, BGP-4, IS-IS, Policy Routing, IGMP,MSDP,PIM-DM,PIM-SM, MBGP
Multiprotocol switching	Label	MPLS,
Transmission protocol	layer	TCP, UDP
Application Protocol and Application	Layer	Telnet, Dumb Terminal, Terminal Server, FTP, TFTP, Callback, Configuration function, SNMP, RMON, Private MIBs, POS, RTU
Security Characteristics		AAA RADIUS, Huawei-TACACS, Firewall, NAT, L2TP, GRE, IPSec, IKE, Encryption card, PKI , SSH, RSA, CA
Voice Application		VOIP, VOFR, IP Fax, IPHC, GK Client, E1 Voice, T1 Voice, H.323, SIP
QoS Application		PQ, CQ, WFQ, CBWFQ, CAR, GTS,WRED, LR
Reliability Functions		VRRP, Backup Center

2.3.2 Hardware

Table 2-2 Hardware Specifications of Quidway AR 28-1x Series Routers

Description	AR 28-10	AR 28-11	AR 28-12	AR 28-13	AR 28-14
Module Slots	2 SIC Slots (Up to 2 SICs can be configured as				

	needed) 1MIM Slot (Up to 1 MIM can be configured as needed)				
Fixed Interfaces	1 S/A ,1 10/100M FE	1 S/A ,2 10/100M FE	2 S/A, 2 10/100M FE	1 CE1, 2 10/100M FE	1 CT1, 2 10/100M FE
	1 AUX Port 1 Console Port				
Boot ROM Memory	512KB				
Default SDRAM	128MB				
Maximum SDRAM	128M				
Flash	32MB				
Forwarding Rate	80Kpps				
Dimensions (W X H X D)	442 X 44.4 X 315 mm (including the rubber feet)				
Weight	6kg				
Input Voltage	AC:100V to 240V 50/60Hz DC:-48V to -60V				
Max. Power Consumption	60W				
Operating Temperature	0 to 40°C				
Operating Humidity	10 to 90%, non-condensing				

3 Quidway AR 28-30/31

3.1 Introduction

Adopting the modular structure, high speed CPU technology and fast routing mechanism, Quidway AR 28-30/31 Routers provide abundant low speed service interfaces to meet the requirements of such leased line services as DDN, packet-switching network and Frame Relay, and to satisfy the networking

requirements of such dial-up line services as PSTN and ISDN. Latest xDSL technology is also adopted to meet the trend of broadband IP network.

They can be used as the core and branch routers for SME to provide secure and reliable network solution in combination with our other network products.

Quidway AR 28-30 Series Routers contain two types: AR 28-30 and AR 28-31. Quidway AR 28-30 provides one 10/100 Mbps Ethernet port and three network module slots (for MIM). AR 28-31 provides two 10/100 Mbps Ethernet ports and three network module slots (for MIM).



Figure 3-1 Quidway AR 28-30 Front View



Figure 3-2 Quidway AR 28-30 Rear View



Figure 3-3 Quidway AR 28-31 Front View



Figure 3-4 Quidway AR 28-31 Rear View

3.2 Key benefits

3.2.1 Abundant Interface Types

Quidway AR 28-30 Series Routers support many middle-and-low-speed service interfaces, including synchronous serial interface, asynchronous serial interface, E1/T1, CE1/CT1, ISDN BRI, ISDN PRI, FXS, FXO, E&M, E1VI, T1VI, and so on. They also fully meet various networking requirements of DDN, Frame Relay, X.25, PSTN, ISDN and asynchronous leased line.

3.2.2 Perfect Security Protecting System

Quidway AR 28-30 Series Routers provide comprehensive security solutions. The security solution contains: packet filtering firewall, network address translation, VPN, Call Back technique, AAA, log administration, and so on.

3.2.3 Constructing VPN

Intranet VPN interconnects distributed points of the Intranet through the public network so as to serve as the extension or replacement of the traditional leased line network or other Intranets. Access VPN helps set up secure channels for small size users such as SOHO to access the resources of the company headquarters through PSTN/ISDN. Extranet VPN extends the Intranets to the partners or the clients, so as to enable different Intranets to conduct secure and private communications to each other through the public network. Quidway AR 28-30 series routers mainly serve as LNS (L2TP Network Server).

3.2.4 Integrated Voice Solutions

Quidway AR 28-30/31 Routers are key components of integrated voice over packet solutions, which include a rich family of Voice Gateway, GK and billing systems. Quidway AR 28-30/31 Routers deliver high quality and density VoIP and VoFR services to enterprises. By supporting standard H.323 and SIP protocols,



our integrated voice over packet solutions can inter-operate with other mainstream manufacturers' equipments.

3.3 Specifications

3.3.1 Product features

Table 3-1 Software Specifications of Quidway AR 28-3x Series Routers

Network Interconnection Protocol	Ethernet, PPP, PPPoE, SLIP, FR,LAPB, X.25, ISDN, HDLC, DCC, MODEM, MP,
Network Layer Protocol and Application	IP, DLSw, IP Fast Switch, DHCP Client/Server/Relay, IPX , Auto-install
Routing Protocol	Static Routing, OSPF, RIPv1/v2, BGP-4, IS-IS, Policy Routing, IGMP,MSDP,PIM-DM,PIM-SM, MBGP
Multiprotocol Label switching	MPLS,
Transmission layer protocol	TCP, UDP
Application Layer Protocol and Application	Telnet, Dumb Terminal, Terminal Server, FTP, TFTP, Callback, Configuration function, SNMP, RMON, Private MIBs, POS, RTU
Security Characteristics	AAA RADIUS, Huawei-TACACS, Firewall, NAT, L2TP, GRE, IPSec, IKE, Encryption card, PKI, SSH, RSA, CA
Voice Application	VOIP, VOFR, IP Fax, IPHC, GK Client, E1 Voice, T1 Voice, H.323, SIP
QoS Application	PQ, CQ, WFQ, CBWFQ, CAR, GTS,WRED, LR
Reliability Functions	VRRP, Backup Center

3.3.2 Hardware

Table 3-2 Hardware Specifications of Quidway AR 28-3x Series Routers

Description	AR 28-30	AR 28-31
Module Slots	3 Slots for MIM	
Fixed Interfaces	1 10/100Mbps Ethernet Interface	2 10/100Mbps Ethernet Interfaces
	1AUX Port ,1 Console Port	
Boot ROM Memory	512KB	
Default SDRAM	128MB	
Maximum SDRAM	256MB	
Flash	32MB	
Forwarding Rate	90Kpps	
Dimensions (W×H×D)	442 X 44.3 X 413 mm (including the rubber feet)	
Weight	8kg	
Input Voltage	AC:100 ~ 240V 50/60Hz, DC:-48 ~ -60V	
Max Power Consumption	80W	
Operating Temperature	0 to 40°C	
Operating Humidity	10 to 90%, non-condensing	

4 Quidway AR 28-40/80

4.1 Introduction

Adopting the modular structure, high speed CPU technology and fast routing strategy, Quidway AR 28-40/80 Routers provide abundant low speed service interfaces to meet the requirements of such leased line services as DDN, packet-switching network and Frame Relay, and to satisfy the networking requirements of such dial-up line services as PSTN and ISDN. Latest xDSL technology is also adopted to meet the trend of broadband IP network.

They can be used as the core and branch routers for medium and small enterprises to provide secure and reliable multiple network solution in

combination with our other network products. Quidway AR 28-40/80 support ATM/GE/MPLS.

Quidway AR 28-40 provides 4 multifunction interface module (MIM) slots, and AR 28-80 provides 8 MIM slots. The two models use the same multifunction interface module (MIM).



Figure 4-1 Quidway AR 28-40 Front View



Figure 4-2 Quidway AR 28-40 Rear View



Figure 4-3 Quidway AR 28-80 Front View



Figure 4-4 Quidway AR 28-80 Rear View

4.2 Key benefits

4.2.1 Powerful backup function

Support the function of interface backup, link backup and route backup. The routers can be configured in the active/stand-by mode between the leased line and the dial-up link, between the leased line and the virtual link, or between two dial-up links. They can also be active/standby configured between the DDN, FR, X.25, PSTN, ISDN, etc.

4.2.2 Higher access speed and more powerful processing capability

Quidway AR 28-40/80 Series Routers each support up to 112 (AR 28-80) analog dial-up users or 56 (AR 28-80) ISDN BRI dial-up users, capable of providing a high-density remote office solution. It can access up to 28 (AR 28-80) 2M synchronous interfaces for connecting DDN, frame relay and X.25 networks. Quidway AR 28-40/80 Series Routers can serve as not only the core routers in the small and medium size Intranets but also the access routers in the large networks.

4.2.3 Enterprise Core Router

Quidway AR 28-40/80 Series Routers usually work at the core layer of enterprise network and provide GE or ATM uplink to intranet. Quidway AR 28-40/80 Series Routers also provide comprehensive security solutions. The security solution contains: packet filtering firewall, network address translation, VPN, Call Back technique, AAA, log administration, and so on.

4.2.4 Integrated Voice Solutions

Quidway AR 28-40/80 Routers are key components of our integrated voice over packet solutions, which include a rich family of Voice Gateway, GK and billing



systems. Quidway AR 28-40/80 Routers deliver high quality and density VoIP and VoFR services to enterprises. By supporting standard H.323 and SIP protocols, our integrated voice over packet solutions can inter-operate with other mainstream manufacturers' equipments.

4.3 Specification

4.3.1 Product features

Table 4-1 Software Specifications of Quidway AR 28-40 and AR 28-80

Network Interconnection Protocol	Ethernet, PPP, PPPoE, SLIP, FR,LAPB, X.25, ISDN, HDLC, DCC, MODEM, MP
Network Layer Protocol and Application	IP, DLSw, IP Fast Switch, DHCP Client/Server/Relay, IPX , Auto-install
Routing Protocol	Static Routing, OSPF, RIPv1/v2, BGP-4, IS-IS, Policy Routing, IGMP,MSDP,PIM-DM,PIM-SM,MBGP
Multiprotocol Label switching	MPLS,
Transmission layer protocol	TCP, UDP
Application Layer Protocol and Application	Telnet, Dumb Terminal, Terminal Server, FTP, TFTP, Callback, Configuration function, SNMP, RMON, Private MIBs, POS, RTU
Security Characteristics	AAA RADIUS, Huawei-TACACS, Firewall, NAT, L2TP, GRE, IPSec, IKE, Encryption card, PKI, SSH, RSA,, CA
Voice Application	VOIP, VOFR, IP Fax, IPHC, GK Client, E1 Voice, T1 Voice, H.323, SIP
QoS Application	PQ, CQ, WFQ, CBWFQ, CAR, GTS,WRED, LR
Reliability Functions	VRRP, Backup Center

4.3.2 Hardware

Table 4-2 Hardware Specifications of Quidway AR 28-40 and AR 28-80

Description	AR 28-40	AR 28-80
Module Slots	4 Slots for MIM	8 Slots for MIM
Fixed Interfaces	1 AUX Port,1 Console Port	
Boot ROM Memory	512KB	
Default SDRAM	128MB	
Maximum SDRAM	256MB	
Flash	32MB	
Fowarding Rate	120Kpps	
Dimensions (W X H X D)	442 X 44.3 X 413 mm (include the rubber feet)	442 X 88.2 X 413 mm (include the rubber feet)
Weight	8kg	14kg
Input Voltage	AC:100 ~ 240V 50/60Hz DC:-48 ~ -68V	AC:100 ~ 240V 50/60Hz DC:-48 ~ -60V
Max. Power Consumption	80W	120W
Operating Temperature	0 to 40°C	
Operating Humidity	10 to 90%, non-condensing	

5 Modules

5.1 MIMs for Quidway AR 28-09/10/11/12/13/14/30/31/40/80

- 1/2-Port 10/100Base-TX Ethernet Network Module (RT-1/2FE)
- 1-Port 100M Fast Ethernet Multi-mode Fiber Interface Module (RT-1MFX)
- 1-Port 100M Single-mode Fiber Interface Module (RT-1SFX)
- 1/2- port 10/100/1000 base-T module (1/2RT-GBE)
- 1/2-Port 1000M Ethernet Fiber Interface Module(RT-1/2GEF)
- 8/16 Port Fast Switch Module (RT-8/16LS)
- 2/4/8-Port Enhanced Synchronous/Asynchronous Interface Module (RT-2/4/8SAE)
- 8/16-port Asynchronous Serial Interface Card(RJ45) (RT-8/16ASE)

- 6/12-Port Analog Modem Module (RT-6/12AM)
- 2/4/6-Port Fast Connect Modem Module (RT-2/4/6FCM)
- 1/2-Port ADSL over POTS Module (RT-1/2ADSL)
- 1/2-Port ADSL over ISDN Module (RT-1/2ADSL over ISDN)
- 1/2/4-Port G.SHDSL Module (RT-1/2/4 G.SHDSL)
- 4-Port ISDN BRI S/T Module (RT-4BS)
- 4-Port Enhanced ISDN BRI S/T Module(RT-4BSE)
- 1/2/4-Port E1/CE1/PRI Module (RT-1/2/4/8CE1)
- 1-Port channelized E3 Module (RT-1CE3)
- 1/2/4-Port T1/CT1/PRI Module (RT-1/2/4/8CT1)
- 1-Port channelized T3 Module (RT-1CT3)
- 1/2/4-Port Fractional E1 Module (RT-1/2/4/8 E1-F)
- 1/2/4-Port Fractional T1 Module (RT-1/2/4/8 T1-F)
- 1-Port OC-3 ATM Multi-mode, SC Optical Interface Module (RT-1ATM-OC3MM)
- 1-Port OC-3 ATM Single-mode, SC Optical Interface 15km Module (RT-1ATM-OC3SM)
- 1-Port OC-3 ATM Single-mode, SC Optical Interface 30km Module (RT-1ATM-OC3SML)
- 1-Port 25.6M ATM Module (RT-ATM-25M)
- 1-Port E3 ATM Module (RT-ATM-E3)
- 1-Port T3 ATM Module (RT-ATM-T3)
- 4/8 Port ATM IMA T1 (MIM-IMA-4/8T1)
- 4 Port ATM-IMA-4E1(120) (RT-ATM-4E1)
- 4 Port ATM-IMA-4E1(75) (RT-ATM-4E1)
- 8 Port ATM-IMA-8E1(120) (RT-ATM-8E1)
- 8 Port ATM-IMA-8E1(75) (RT-ATM-8E1)
- 1-port Channelized POS 155M to E1/T1 Interface Module (SFP) (RT-1CPOS(E/T)
- 1 Port POS
- 2/4-Port Voice Network Module with Analog SLIC Line Module (RT-2/4 FXS)
- 2/4-Port Voice Network Module with Analog Trunk Module (RT-2/4 FXO)
- 2-Port Voice Network Module with E&M Trunk Module (RT-2/4 E&M)
- 2/4-Port Voice AT0 Foreign Exchange Office Interface Card-V2 (RT-2/4FXO-V2)
- 2/4-Port Voice User Circuit Interface Card -V2 (RT-2/4FXS-V2)
- 1-Port E1 Voice Module (RT-E1VI)
- 1-Port T1 Voice Module (RT-T1VI)
- 2-Port BRI Voice Module(RT-2BSV)
- Network Data Encryption Card Module (RT-NDEC)
- High Performance Network Data Encryption Module(RT-HNDE)

5.2 SICs for Quidway AR 28-09/10/11/12/13/14

- 1-Port 10M Ethernet Interface Card (RT-SIC-1ETH)

- 1-Port 10/100M Ethernet Interface Card (RT-SIC-1FEA)
- 1-Port Synchronous/Asynchronous Serial Interface Card (RT-SIC-1SA)
- 1-Port Enhanced Synchronous/Asynchronous Interface Module(RT- SIC-1SAE)
- 3-Port Asynchronous Serial Interface Card (RT-SIC-3AS)
- 1/2-Port ISDN BRI S/T Interface Card (RT-SIC-1/2BS)
- 1/2-Port ISDN BRI U Interface Card (RT-SIC-1/2BU)
- 1-Port E1/cE1/PRI Interface Card (RT-SIC-EPRI)
- 1-Port Fractional E1 Interface Card (RT-SIC-E1-F)
- 1-Port T1/cT1/PRI Interface Card (RT-SIC-TPRI)
- 1-Port Fractional T1 Interface Card (RT-SIC-T1-F)
- 1/2-Port Analog Modem Interface Card (RT-SIC-1/2AM)
- 1/2-Port Voice User Circuit Interface Card (RT-SIC-1/2FXS)
- 1/2-Port Voice AT0 Foreign Exchange Office Interface Card (RT-SIC-1/2FXO)
- 1/2-Port Voice User Circuit Interface Card-V2(RT-SIC-1/2 FXS-V2)
- 1/2-Port Voice AT0 Foreign Exchange Office Interface Card-V2 (RT-SIC-1/2 FXO-V2)
- 1-Port ADSL 2+ over ISDN(RT-SIC-1ADI(ADSL2+))
- 1-Port ADSL 2+ over POTS(RT-SIC-1ADP(ADSL2+))

Notes:

- RT-2FE/RT-1ATM-MM/RT-1ATM-SM/RT-1ATM-SL not supported by AR28-09
- RT-1ATM-MM/RT-1ATM-SM/RT-1ATM-SL not supported by AR28-10
- RT-SIC-1FEA/RT-SIC-1ETH/RT-1ATM-MM/RT-1ATM-SM/RT-1ATM-SL RT-SIC-1ADI/ RT-SIC-ADP not support by AR28-11
- AR28-09/AR28-10 only support one RT-SIC-1FEA, one RT-SIC-1ETH and one RT-SIC-1ADI/ADP; and when use this module, must be in slot 2.
- RT-16ASE/RT-12AM/RT-E1VI/RT-T1VI will occupy two MIM slots.

6 Industry Standards Compliance

6.1 Data Link Layer Protocols

6.1.1 Ethernet

- RFC894(Ethernet II Frame)
- RFC1042(Ethernet SNAP Frame)
- RFC3023 (MPLS Frame)
- IEEE 802.3
- IEEE 802.2
- IEEE 802.1Q
- IEEE 802.1P

- IEEE 802.3u
- RFC3635

6.1.2 PPP

- RFC1172
- RFC1661
- RFC1334
- RFC1994
- RFC1332
- RFC1552
- RFC1638
- RFC1570
- RFC3032
- RFC1377
- RFC1962
- RFC1974
- RFC1990
- RFC1333
- RFC1144
- RFC1973
- RFC1471
- RFC1473
- RFC1989

6.1.3 MP

- RFC1990

6.1.4 PPPoE Client/Server

- RFC2516

6.1.5 SLIP

- RFC1055

6.1.6 Frame Relay

- RFC1490
- Q.933 Annex_A
- T1.617 Annex D
- FRF.1.2
- FRF.3.2
- RFC1294
- Q922 Annex_A
- RFC1293

- RFC 2427
- Q922 Annex_A
- FRF.9
- FRF.20
- FRF.16
- RFC1315
- FRF.11
- FRF.12

6.1.7 ATM

- RFC1483
- RFC2684
- RFC1577
- RFC2364
- RFC1695

6.1.8 X.25

- ITU-T X.25
- RFC1613
- RFC1006
- RFC1381
- RFC1356
- T1.617 Annex G

6.1.9 ISDN

- I.430
- I.431
- Q.921
- Q.931

6.1.10 QSIG

- ECMA-143

6.1.11 DLSw

- RFC1795

6.2 Internet Protocol

6.2.1 ARP

- RFC826

- RFC1042
- RFC1027
- RFC1213

6.2.2 IP Forwarding

- RFC791
- RFC1122
- RFC1071
- RFC1141
- RFC1624
- RFC1256
- RFC 950
- RFC3031
- RFC1213
- RFC2011
- RFC2012
- RFC2013
- RFC1850
- RFC2096

6.2.3 IP Option

- RFC 791
- RFC 1122

6.2.4 ICMP

- RFC 792
- RFC 950
- RFC1256
- RFC1213

6.2.5 TCP

- RFC793
- RFC2012
- RFC1144

6.2.6 UDP

- RFC768
- RFC1213
- RFC2013

6.2.7 DNS

- RFC1034
- RFC1035

6.2.8 DHCP

- RFC1542
- RFC2131
- RFC1531
- RFC1533

6.2.9 IPX

- IEEE 802.3
- IEEE 802.2

6.3 Routing Protocol

6.3.1 RIP

- RFC2453
- RFC1058
- RFC1389
- RFC2082
- RFC2091
- RFC1058
- RFC1724
- RFC1723
- RFC2083

6.3.2 IS-IS

- RFC1195
- ISO10589
- RFC1142
- draft-ietf-isis-wg-mib-02.txt
- RFC2973
- RFC2328

6.3.3 OSPF

- RFC2328
- RFC1587
- RFC1850
- RFC2370
- RFC1583

- draft-rosen-vpns-ospf-bgp-mpls-06
- draft-katz-yeung-ospf-traffic-09
- draft-rosen-ppvnpn-ospf2547-area0-01
- RFC1253

6.3.4 BGP

- RFC1997
- RFC2385
- RFC2796
- RFC2439
- RFC1771
- RFC1772
- RFC1998
- RFC2842
- RFC2439
- RFC2858
- RFC2918
- RFC2547
- draft-ietf-idr-bgp-ext-communities-05
- draft-ramachandra-bgp-ext-communities-04.txt
- RFC1657
- RFC1267
- RFC1966
- RFC1965

6.3.5 MBGP

- RFC1771, RFC2283
- RFC1997, RFC1998
- RFC2796

6.3.6 MPLS/BGP VPN

- RFC2283 RFC2547
- draft-ietf-idr-bgp-ext-communities-05.txt
- draft-ietf-idr-bgp-ext-communities-05.txt
- draft-ietf-ppvnpn-gre-ip-2547-01

6.3.7 Routing Policy

- RFC2280

6.3.8 Routing Management

- RFC1213

6.4 Multicast Protocols

6.4.1 PIM-DM

- draft-ietf-pim-v2-dm-03
- draft-ietf-idmr-pim-dm-06

6.4.2 PIM-SM

- RFC2362

6.4.3 IGMP

- RFC1112
- RFC2236

6.4.4 IGMP SNOOPING

- RFC1112
- RFC2236

6.4.5 MSDP

- draft-ietf-msdp-spec-13

6.4.6 MSDP Trace

- draft-ietf-msdp-traceroute-06
- draft-ietf-idmr-traceroute-ipm-07

6.5 MPLS

6.5.1 LDP

- RFC3031,RFC3032,RFC3036,draft-ietf-mpls-ldp-mib-00.txt,RFC2205,RFC2209,RFC3209,draft-ietf-mpls-lsr-mib-07.txt,RFC2702,draft-ietf-mpls-te-mib-09.txt draft-martini-l2circuit-trans-mpls-08

6.5.2 L2VPN

- draft-martini-l2circuit-encap-mpls-04
- draft-martini-l2circuit-trans-mpls-08
- draft-kompella-ppvpn-l2vpn-02.txt

6.6 Security

6.6.1 AAA

- RFC2865
- RFC2866
- RFC2867
- RFC2869
- RFC2903
- RFC2904
- RFC2906
- RFC2809
- RFC2138
- RFC2620
- draft-ietf-radius-tunnel-auth

6.6.2 RADIUS/TACACS

- RFC2865

6.6.3 NAT

- RFC1631
- RFC2663

6.6.4 L2TP

- RFC2661

6.6.5 GRE

- RFC1701
- RFC1702
- RFC2784
- draft-ietf-ppvpn-gre-ip-2547-01

6.6.6 IPSEC

- RFC2401
- RFC2402
- RFC2403
- RFC2404
- RFC2405
- RFC2406
- RFC2407
- RFC2408
- RFC2410

6.6.7 IKE

- RFC2409

6.6.8 CA

- RFC3280/PKCS#1/PKCS#7/PKCS#8/PKCS#9/PKCS#10/PKCS#12/draft-n
course-scep-06/X.509/X.208/X.209/RFC3279/RFC2252/RFC2510/RFC2511/
RFC2409

6.7 Application Layer Protocol

6.7.1 Telnet Client/Server

- RFC854
- RFC855
- RFC 857
- RFC858
- RFC1091

6.7.2 Rlogin

- RFC1282

6.7.3 FTP Client/Server

- RFC 959

6.7.4 SSH

- draft-ylonen-ssh-protocol-00

6.7.5 NTP

- RFC1305

6.8 Network Management

6.8.1 SNMP

- RFC1157
- RFC1904
- RFC1905
- RFC1906
- RFC1907
- RFC2571
- RFC2572
- RFC2573

- RFC2574
- RFC2575
- RFC1155
- RFC2579
- RFC2580
- RFC2570
- RFC2576
- RFC2578
- RFC1213
- RFC1212
- RFC1901

6.8.2 MIB

- RFC1155
- RFC1213
- RFC1315
- RFC1450
- RFC1471
- RFC1473
- RFC1657
- RFC1724
- RFC1850
- RFC2233
- RFC2273
- RFC2571
- RFC2572
- RFC2573
- RFC2574
- RFC2575
- RFC2665
- RFC2668
- RFC2737
- RFC2787
- RFC2851
- RFC2925

6.8.3 RMON

- RFC1757

6.9 QoS

6.9.1 Congestion Management

- RFC2309

- RFC2474
- RFC2475
- RFC2597
- RFC2598
- RFC3246

6.9.2 IPHC

- RFC1144
- RFC2507
- RFC2508

6.10 High Availability

6.10.1 VRRP

- RFC2338
- RFC2787

6.11 VoIP/FoIP

6.11.1 Signaling

- H.323
- DSS1
- R2

6.11.2 CODEC

- G.711A
- G.711U
- G.729r8
- G.729A
- G.723r53
- G.723r63

6.11.3 RTP

- RFC1889

6.11.4 FoIP

- T.38

7 Product Applications

7.1 Corporation Network Application

The following typical networking modes can be supported:

DDN, frame relay or X.25 as the main link, PSTN or ISDN dial-up line as the backup link, and the networking diagram is shown as below:

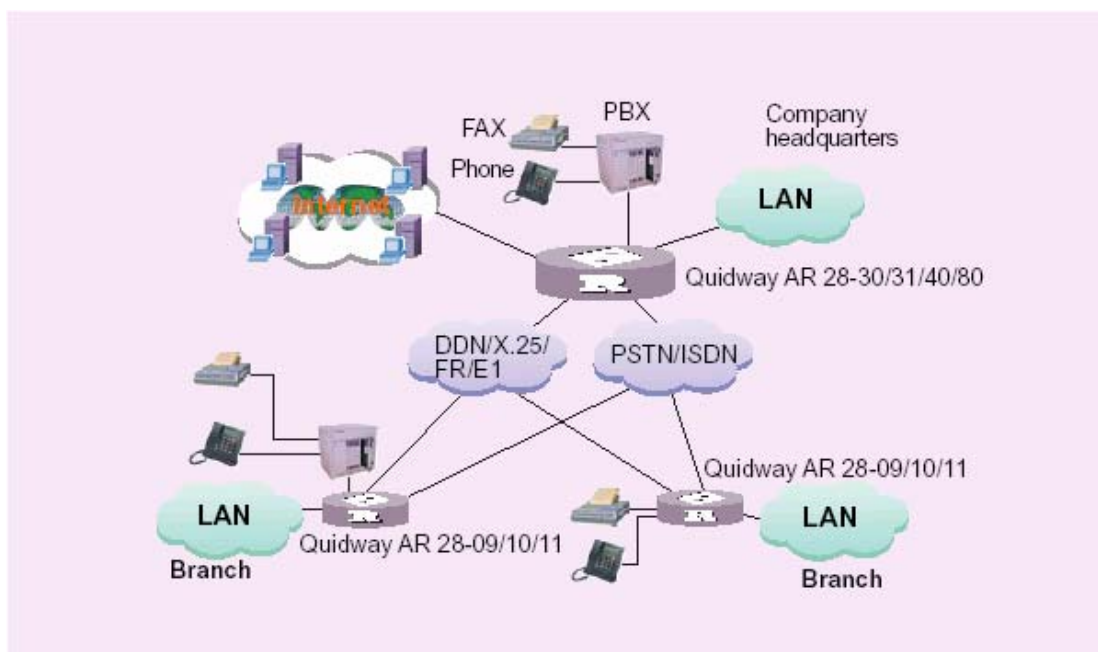


Figure 7-1 Diagram for Implementing Integrated Networking of Enterprises

Main points of networking:

- Quidway AR 28 Series Routers can be connected to the DDN, Frame Relay or X.25 through the SSI (Synchronous Serial Interface) or CE1 module, to PSTN through the ASI (Asynchronous Serial Interface) module via the Modem pool, and to ISDN BRI through the BRI module.
- The main lines and backup lines are automatically swapped by the router. The backup modes may be dial-up backup or router backup.

7.2 "Integrated" Terminal Solution for Regional Banks

Regional banks can use the terminal server services and SNA function of Quidway AR 28 Series Routers to realize the coexistence of the SNA network and TCP/IP network, so as to provide new services based on IP and finally transit everything in IP network without changing the original system.

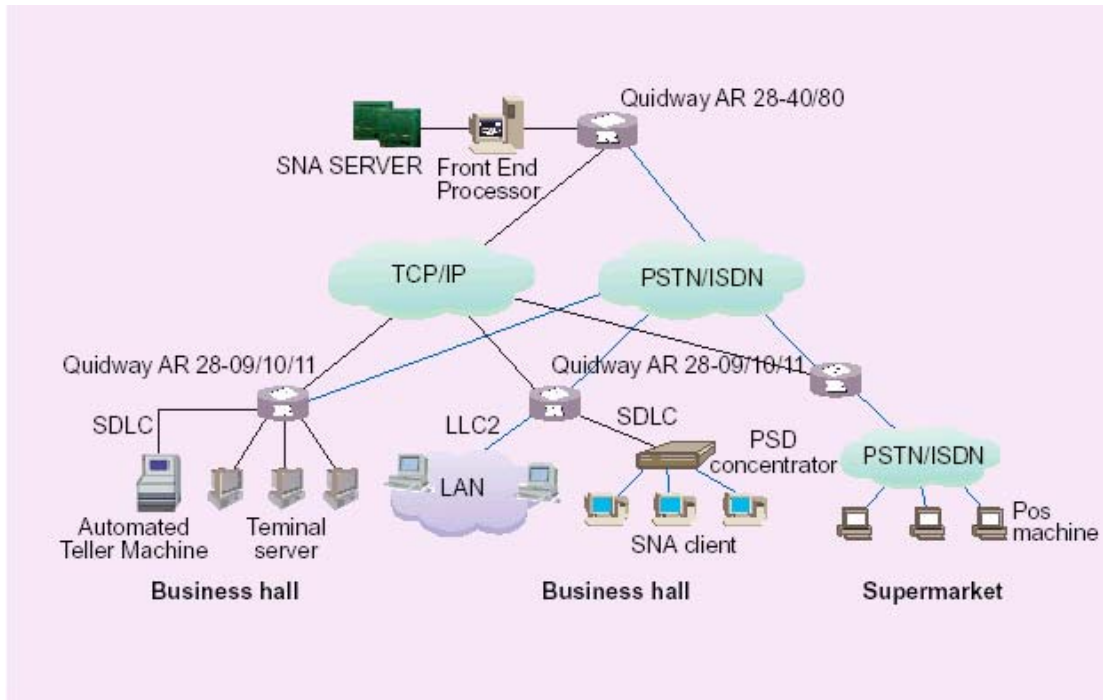


Figure 7-2 Diagram of Implementing "Integrated" Terminal Solution for Regional Banks

7.3 Voice Solution

In the headquarters, Quidway AR 28-80/40 routers serve as the voice gateway devices to implement VoIP function on the E1 line. In each branch, Quidway AR 28-09/10/11 router is used to connect PBX or telephone to transform the voice signals between the legacy circuit switching network and IP network, providing enterprises with voice solution of high quality and low cost.

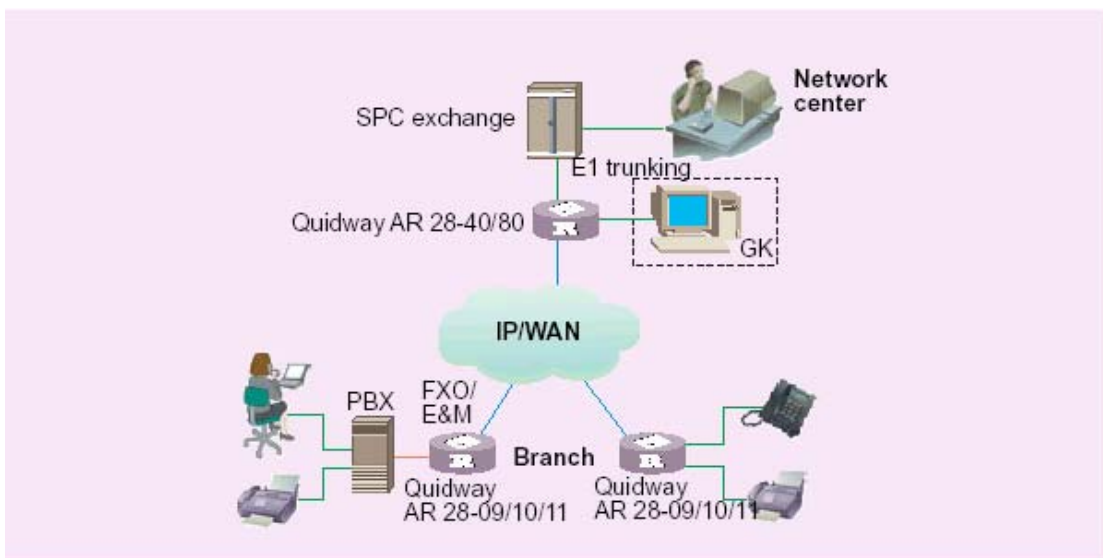


Figure 7-3 Diagram for Voice Solution of Quidway AR 28 Series Routers

In the diagram, the GK system is optional. When the system is not on large scale, they can be interconnected by means of gateway fixed distribution mode, easy to

manage. When the system is with complicated hierarchy and architecture, GK is required to perform integrated management.

7.4 Secure VPN Application

Quidway AR 28 Series Routers, serving as VPN gateways, support tunneling technologies such as L2TP or GRE and guarantee quality and security of information transmission on networks, integrating IPSec, NAT, firewall, and QoS technologies.

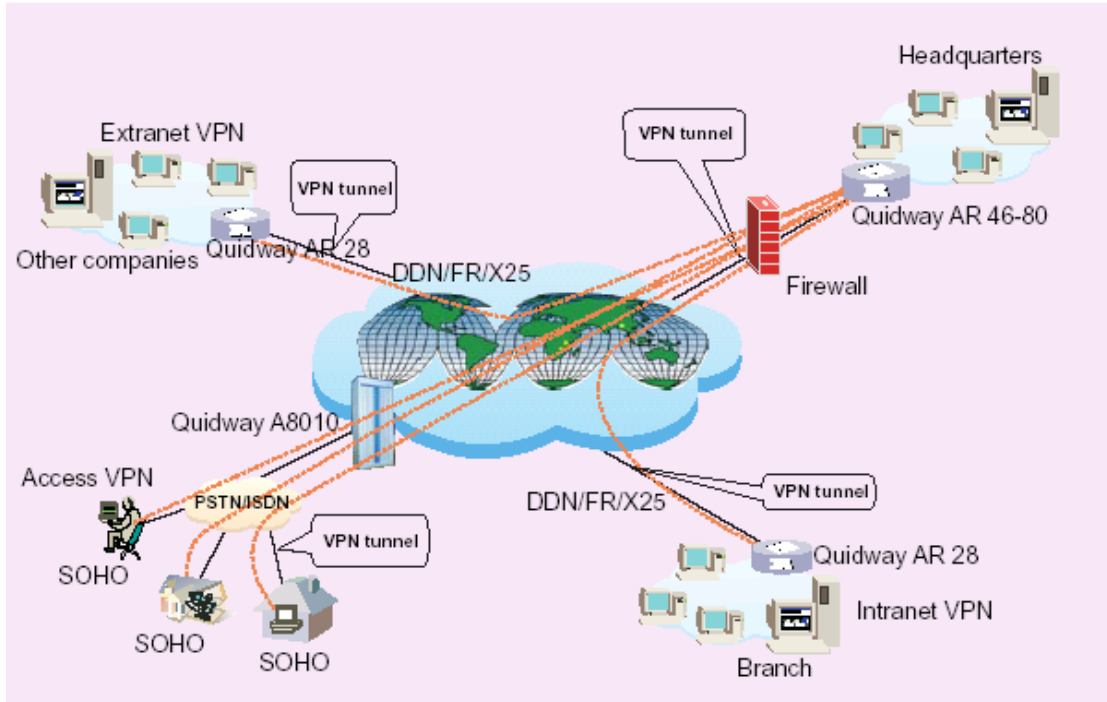


Figure 7-4 Diagram for Secure VPN Applications

- Access VPN allows telecommuting employees to remotely access company network, so that they can continue on their tasks either at home or on business trip. These people are connected to the VPN server at the headquarters over the private tunnels with the VPN service provided by the local ISP.
- Intranet VPN provides a means for the overseas organizations, branches, and offices of a company to interconnect with headquarters. It ensures security of information transferred on Intranet VPN over public Internet by applying tunneling and encryption technologies.
- Extranet VPN allows business partners and clients to access the company headquarters without compromising security of the Intranet.

7.5 MPLS VPN Solution

7.5.1 Typical MPLS VPN networking

The legacy VPN adopting Permanent Virtual Circuit (PVC) and tunneling technologies has been proved successful. However, as the network grows larger, it is facing more and more problems on scalability, manageability and QoS.

MPLS is the latest achievement on integrated routing/switching solution. It integrates the flexibility of IP routing technology and the simplicity of L2 switching. In addition, it has an outstanding advantage on VPN construction. A MPLS network can conveniently implement the IP-based VPN services to satisfy VPN scalability and manageability. Security measures can be taken on the MPLS VPN to isolate the VPNs. MPLS network also provides powerful QoS mechanism to guarantee the quality of VPN services such as bandwidth, transmission, and delay.

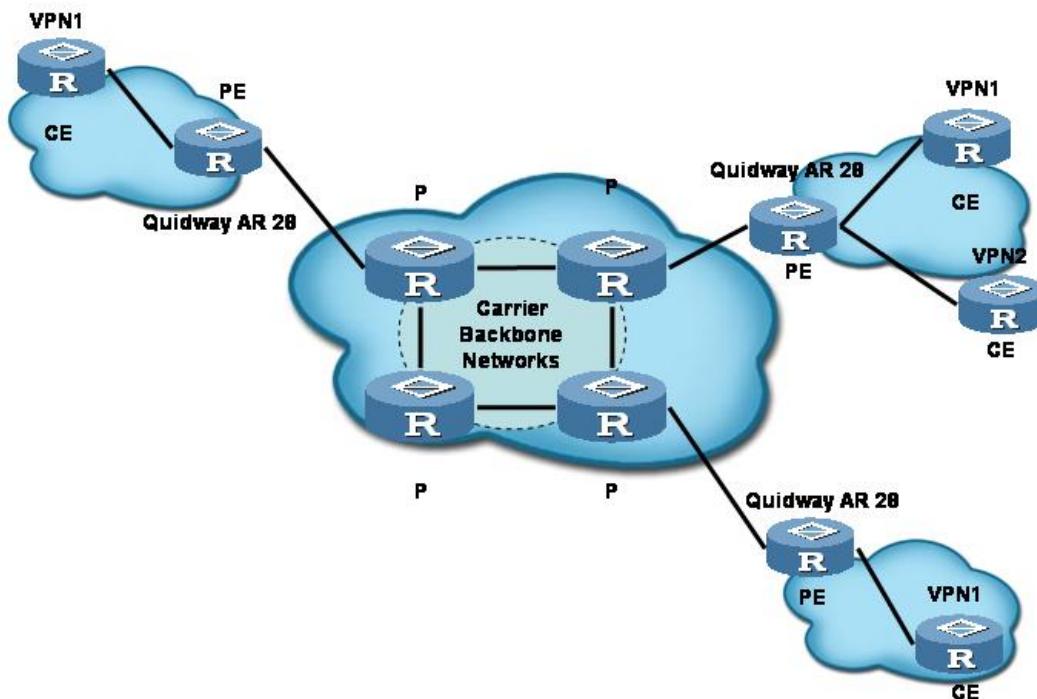


Figure 7-5 Diagram for MPLS VPN Networking with Quidway AR 28 Series Routers

- Users are provided with LAN (and even inter-AS) MPLS VPN services.
- A VPN with all its sites belonging to an enterprise is called an Intranet, while a VPN containing sites of different enterprises are called an Extranet. Quidway AR 28 Series Routers provide MPLS VPN access to Intranet and Extranet and Internet egress for the VPN users.
- Quidway AR 28 Series Routers, serving as a Provider Edge (PE) router, is directly connected with the Customer Edge (CE) router to perform all the

VPN-related functionalities. It exchanges routing information with other PEs through IBGP. A PE can be connected with more than one CE.

- MPLS VPN uses edge LSR (PE) to add Label to the IP packets. The LSR (P) at ISP side can judge the destination of the data according to the Label. Additional routing of the data inside a VPN is not required so that MPLS VPN can achieve high speeding forwarding and support large -scaled VPN network.

7.5.2 HoPE Solution

In BGP MPLS VPN, since a PE device has to aggregate multiple VPN routes, a bottleneck is likely to occur if there are too many subscribers to be accessed by a PE with relatively less capacity. To solve this problem, we brought forward the Hierarchy of PE (HoPE) solution. HoPE separates the PEs on an MPLS VPN network into different layers to form a hierarchical BGP MPLS VPN network. The PE at different layer plays different role. The PE at a higher layer requires more on routing and forwarding capacity and mainly interconnects the backbone network and accesses large VPN subscribers. A PE at a lower layer requires less on routing and forwarding capacity and mainly accesses the VPN subscribers at the edge. Such network can be infinitively nested; the scalability of BGP / MPLS VPN is also significantly improved.

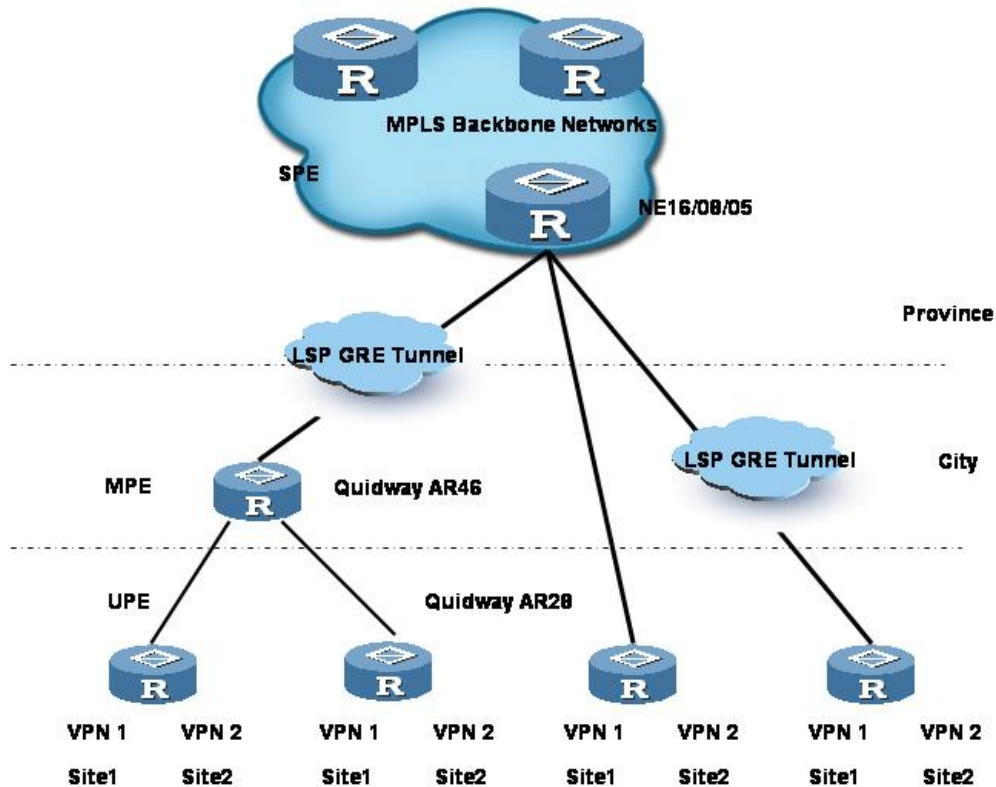


Figure 7-6 Diagram for HoPE Solution with Quidway AR 28 Series Routers



- PE includes SPE, MPE and UPE. PEs at different levels adopt label switching among each other and can be directly connected via interfaces / sub-interfaces of different forms or through tunnels.
- UPE provides multiple interfaces to maintain the routes to the directly connected VPN Sites, but not maintain the routes to other remote sites. It also allocates internal label for the routes to the directly connected sites and advertises them to SPE;
- SPE maintains all the routes in the VPN containing the directly Sites via UPE. These routes include the routes in local and remote sites. However, it advertises VPN routing / forwarding instance (VRF) default route with label to UPE only.
- When SPE and UPE belong to the same carrier, SPE-UPE protocol adopts MP-iBGP and SPE serves as RR. When SPE and UPE belong to different carriers, SPE-UPE protocol adopts MP-eBGP and UPE normally uses private AS number.