

# Sample Configuration and Verification for Cable in Routing Mode

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## Introduction

In comparison to cable modems from other vendors, the ability to truly route IP packets is one of the primary advantages of the Cisco uBR900 Series Cable Access Routers. A typical configuration for the Cisco uBR900 Series Cable Access Router involves connecting the Ethernet port on the router to an internal Ethernet hub that provides connectivity with an existing network. The Cisco uBR900 series supports Routing Information Protocol Version 2 (RIP V2), RIP version 1 and Interior Gateway Routing Protocol (IGRP). In this example, RIP V2 is used.

When configured in routing mode, the Cisco uBR900 series is automatically configured to use the headend's IP address as its IP default gateway. This allows the cable access router to send packets not intended for the Ethernet interface to the headend when IP host routing is configured.

RIP V2 routing is useful for small internetworks in that it enables optimization of Network Interface Center (NIC)-assigned IP addresses by defining variable-length subnet masks (VLSMs) for network addresses, and it allows classless interdomain routing (CIDR) addressing schema.

## Before You Begin

### Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

### Prerequisites

There are no specific prerequisites for this document.

### Components Used

The information in this document is based on the software and hardware versions below.

- Cisco uBR904 running Cisco IOS® Software Release 12.0(7)T
- Cisco uBR7223 running Cisco IOS Software Release 12.1(2)T

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

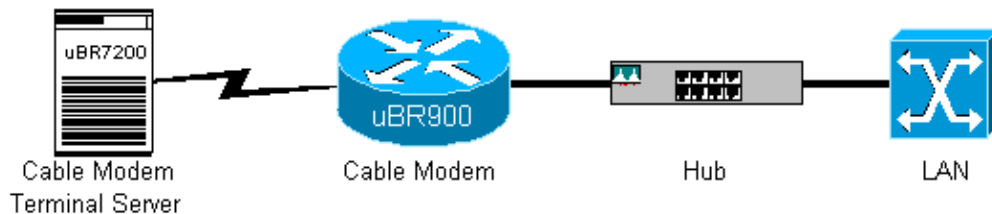
## Configure

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

## Network Diagram

This document uses the network setup shown in the diagram below.



## Configurations

This document uses the configurations shown below.

- uBR904
- uBR7200

This configuration involves the exchange of Routing Information Protocol (RIP) routes between the Cable Modem Termination System (CMTS) and the Cable Modem (CM). Each RIP-enabled router will advertise its entire routing table out to all other routers every thirty seconds. As such, it must be noted that having many cable access routers configured to send RIP updates to the CMTS can result in a severe performance degradation. Such a configuration should be implemented with caution. When implementing this configuration, you should monitor the cable links while increasing the number of CMs with a RIP configuration.

**Note:** In older Cisco IOS versions, the cable interface will show an actual IP address as opposed to "IP address negotiated." Also note that the default **bridge-group 59** command has been removed from the Ethernet and cable interfaces and **no cable-modem compliant bridge** command has been added. Finally, IP routing has been configured. The **ip routing** command however, is not visible in the configuration.

```
uBR904
Current configuration:
!
! Last configuration change at 10:20:42 - Tue Nov 21 2000
! NVRAM config last updated at 09:31:34 - Tue Nov 21 2000
!
version 12.0
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
```

```
hostname Router
!
!
!
!
!
!
clock timezone - 0
ip subnet-zero
!
!
!
!
!
interface Ethernet0
 ip address 100.1.1.1 255.255.255.0
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
!
interface cable-modem0
 ip address negotiated
 no ip directed-broadcast
 ip rip send version 2
 ip rip receive version 2
 cable-modem downstream saved channel 453000000 28 1
 cable-modem mac-timer t2 40000
 no cable-modem compliant bridge
!
router rip
 version 2
 network 10.0.0.0
 network 100.0.0.0
!
ip default-gateway 10.1.1.10
ip classless
ip route 0.0.0.0 0.0.0.0 10.1.1.10
no ip http server
!
!
line con 0
 transport input none
line vty 0 4
!
end

Router#
```

### uBR7200

Building configuration...

Current configuration:

```
!
! Last configuration change at 12:48:11 UTC Tue Nov 21 2000
! NVRAM config last updated at 16:55:12 UTC Mon Nov 20 2000
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname sniper
!
```

```
boot system flash ubr7200-ik1s-mz_121-2_T.bin
enable password cisco
!
no cable qos permission create
no cable qos permission update
cable qos permission modems
!
!
!
!
ip subnet-zero
no ip domain-lookup
!
no lane client flush
!
!
!
!
interface FastEthernet0/0
no ip address
shutdown
half-duplex
!
interface Ethernet1/0
ip address 172.17.110.139 255.255.255.224
ip rip send version 2
ip rip receive version 2
!
interface Ethernet1/1
no ip address
shutdown
!
interface Ethernet1/2
no ip address
shutdown
!
interface Ethernet1/3
no ip address
shutdown
!
interface Ethernet1/4
no ip address
shutdown
!
interface Ethernet1/5
no ip address
shutdown
!
interface Ethernet1/6
no ip address
shutdown
!
interface Ethernet1/7
no ip address
shutdown
!
interface Cable2/0
ip address 10.10.1.1 255.255.255.0 secondary
ip address 10.1.1.10 255.255.255.0
ip rip send version 2
ip rip receive version 2
no keepalive
cable downstream annex B
cable downstream modulation 64qam
cable downstream interleave-depth 32
cable downstream frequency 451250000
```

```

cable upstream 0 frequency 28000000
cable upstream 0 power-level 0
no cable upstream 0 shutdown
cable upstream 1 shutdown
cable upstream 2 shutdown
cable upstream 3 shutdown
cable upstream 4 shutdown
cable upstream 5 shutdown
cable dhcp-giaddr policy
cable helper-address 172.17.110.136
!
interface Cable3/0
no ip address
no keepalive
shutdown
cable downstream annex B
cable downstream modulation 64qam
cable downstream interleave-depth 32
cable upstream 0 shutdown
cable upstream 1 shutdown
cable upstream 2 shutdown
cable upstream 3 shutdown
cable upstream 4 shutdown
cable upstream 5 shutdown
!
router rip
version 2
network 10.0.0.0
network 172.17.0.0
!
ip classless
ip route 0.0.0.0 0.0.0.0 172.17.110.129
no ip http server
!
!
line con 0
exec-timeout 0 0
transport input none
line aux 0
line vty 0
exec-timeout 0 0
password cisco
login
line vty 1 4
password cisco
login
!
end

sniper#

```

## Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool ( registered customers only) , which allows you to view an analysis of **show** command output.

- **show cable modem** – Lists the status of the cable modems that are attached to the CMTS.
- **show ip route** – Ensures routes have been dynamically learned.

The following command output shows the **show cable modem** command on the Cisco uBR7200.

```
sniper#show cable modem
Interface   Prim Online   Timing Rec   QoS CPE IP address   MAC address
           Sid  State    Offset Power
Cable2/0/U0 11  online   2290   0.50  5  0  10.1.1.25   0050.7366.2223
Cable2/0/U0 12  online   2812   0.50  5  0  10.1.1.28   0001.9659.4415
Cable2/0/U0 13  online   2811  -0.25  5  0  10.1.1.21   0030.96f9.65d9
Cable2/0/U0 14  online   2287  -0.25  5  0  10.1.1.20   0050.7366.2221
Cable2/0/U0 15  online   2290   0.25  5  0  10.1.1.22   0050.7366.1fb9
Cable2/0/U0 16  online   2815  -0.25  5  0  10.1.1.27   0001.9659.4461
```

The following command output shows the **show ip route** on the CM.

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.1.1.10 to network 0.0.0.0

    100.0.0.0/24 is subnetted, 1 subnets
C       100.1.1.0 is directly connected, Ethernet0
R    172.17.0.0/16 [120/1] via 10.1.1.10, 00:00:23, cable-modem0
    10.0.0.0/24 is subnetted, 1 subnets
C       10.1.1.0 is directly connected, cable-modem0
S*    0.0.0.0/0 [1/0] via 10.1.1.10
Router#
```

The following command output shows the **show ip route** on the CMTS.

```
sniper#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.17.110.129 to network 0.0.0.0

R    100.0.0.0/8 [120/1] via 10.1.1.20, 00:00:05, Cable2/0
    172.17.0.0/27 is subnetted, 1 subnets
C       172.17.110.128 is directly connected, Ethernet1/0
    10.0.0.0/24 is subnetted, 2 subnets
C       10.10.1.0 is directly connected, Cable2/0
C       10.1.1.0 is directly connected, Cable2/0
S*    0.0.0.0/0 [1/0] via 172.17.110.129
sniper#
```

## Troubleshoot

This section provides information you can use to troubleshoot your configuration.

If the state does not show **online** (for example, offline or init(d) and so forth) you need to troubleshoot this. From the Cisco uBR900, you can enter the **debug cable-modem mac log verbose** command. For more information on the troubleshooting see Troubleshooting uBR Cable Modems Not Coming Online .

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## Related Information

- [Cable Support Page](#)
  - [Bridging and Routing Features for the Cisco uBR904 Cable Modem](#)
  - [Troubleshooting uBR Cable Modems Not Coming Online](#)
  - [Broadband/Cable Solutions Documentation](#)
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