

# Configuring Cable Modem Voice Using H323v2 Static Mapping

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## Introduction

### Before You Begin

- Conventions

- Prerequisites

- Components Used

- VoIP Summary

### Configure

- Network Diagram

- Configurations

### Verify

- show Commands

- debug Commands

### Troubleshoot

**NetPro Discussion Forums – Featured Conversations**

**Related Information**

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## Introduction

This document is a sample configuration for Voice over IP (VoIP) between two cable modems connected through the same Cable Modem Terminal System (CMTS). The call is established end to end without going through the Public Switched Telephone Network (PSTN). The cable modems are configured in bridging mode, however, they can be equally configured for routing mode without changing any of the VoIP configurations. This document provides a basic VoIP setup in a lab configuration.

## Before You Begin

### Conventions

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

### Prerequisites

You should be familiar with a basic understanding of the Data-over-Cable Service Interface Specifications (DOCSIS) and H323 protocols.

### Components Used

This document is not restricted to specific software and hardware versions.

### VoIP Summary

VoIP allows normal telephony-style voice to be carried over an IP-based internet with Plain Old Telephone Service (POTS)-like functionality, reliability, and voice quality. Using a voice supported Cisco uBR92x series router such as the uBR924 or the CVA 122, packets are transmitted and received in a digitized form over an IP network. Voice traffic is supported in both the DOCSIS-bridging and routing modes.

**Note:** When the cable modem router is acting in DOCSIS–bridging mode, a voice call originating from the router's Ethernet interface cannot terminate on another device attached to that same Ethernet interface; it must terminate on a device that is reached through the cable interface. To allow calls to both originate and terminate on the Ethernet interface, the router must be configured in routing mode.

Voice signals are packetized and transported in compliance with the following protocols:

- H.323v2: second version of an International Telecommunications Union (ITU) standard that specifies call signaling and control protocols for an IP data network. Supported on Cisco IOS® Software Release 12.0(4)XI and later voice images.
- Simple Gateway Control Protocol (SGCP) Version 1.1: a signaling protocol under review by the Internet Engineering Task Force (IETF). Supported on Cisco IOS Software Release 12.0(7)T and later voice images.
- Media Gateway Control Protocol (MGCP) Version 0.1: a proposed IETF voice control protocol intended to eventually supersede the existing SCGP 1.1 protocol. Supported on Cisco IOS Software Release 12.1(3)T and later voice images.

**Note:** If using SGCP or MGCP, the Cisco cable modem router acts as the residential gateway that forwards the voice packets to the CMTS, which then connects to the external call agent (SGCP or MGCP) or media gateway controller. The call agent or controller determines how to transmit the call across the network to the trunking gateway that will be its ultimate destination.

In this setup, the H.323v2 protocol is used. For more on H.323, refer to H.323 Version 2 Support.

A static voice configuration is used when there are only a few sites calling each other. This setup is simple and does not need a gatekeeper.

## Configure

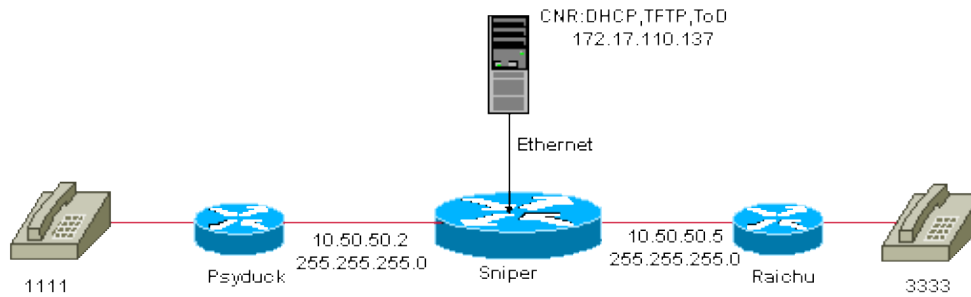
In this section, you are presented with the information to configure the features described in this document.

**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. The following hardware was used in this setup:

- two uBR924 series routers running Cisco IOS 12.1(5)T
- uBR7223 running Cisco IOS 12.1(5)T
- two analog phones each connected to the v1+v2 ports on the uBR924
- Cisco Network Registrar (CNR) acting as DHCP and TFTP servers. In the same server, Time of Day (ToD) is running.



## Configurations

This document uses the configurations shown below.

- Psyduck (uBR924)
- Raichu (uBR924)
- Sniper (CMTS)

### Psyduck (uBR924)

```
Psyduck#wr t
Building configuration...

Current configuration : 1335 bytes
!
! Last configuration change at 13:43:18 - Tue Mar 6 2001
! NVRAM config last updated at 09:38:45 - Tue Mar 6 2001
!
version 12.1
no service single-slot-reload-enable
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Psyduck
!
logging rate-limit console 10 except errors
enable password cisco
!
clock timezone - 0
ip subnet-zero
no ip routing
no ip finger
no ip domain-lookup
!
ip audit notify log
ip audit po max-events 100
call rsvp-sync
!
!
!
!
!
!
!
!
!
!
interface Ethernet0
ip address 10.50.50.2 255.255.255.0
```

```

no ip route-cache
no ip mroute-cache
bridge-group 59
bridge-group 59 spanning-disabled
!
interface cable-modem0
ip address docsis
no ip route-cache
no ip mroute-cache
bridge-group 59
bridge-group 59 spanning-disabled
!
ip default-gateway 10.50.50.1
ip classless
no ip http server
no ip http cable-monitor
!
snmp-server packetsize 4096
snmp-server manager
!
voice-port 0
input gain -2
!
voice-port 1
input gain -2
!
dial-peer voice 1 pots
destination-pattern 1111

!--- Local phone number. Remote cable modem calls this number.

port 0
!
dial-peer voice 10 voip
destination-pattern 3...

!--- Called number starting with 3 and followed by 3
!--- more digits should be sent
!--- to gateway with IP address 10.50.50.5.
!--- In this example, the Raichu cable modem.

session target ipv4:10.50.50.5
!
!
line con 0
exec-timeout 0 0
transport input none
line vty 0
exec-timeout 0 0
password cisco
no login
line vty 1 4
password cisco
no login
!
end

```

### Raichu (uBR924)

```

Raichu# wr t
Building configuration...

Current configuration : 1143 bytes

```

```
!  
! Last configuration change at 13:43:13 - Tue Mar 6 2001  
! NVRAM config last updated at 09:40:02 - Tue Mar 6 2001  
!  
version 12.1  
no service single-slot-reload-enable  
no service pad  
service timestamps debug uptime  
service timestamps log uptime  
no service password-encryption  
!  
hostname Raichu  
!  
logging rate-limit console 10 except errors  
!  
clock timezone - 0  
ip subnet-zero  
no ip routing  
no ip finger  
!  
ip audit notify log  
ip audit po max-events 100  
call rsvp-sync  
!  
!  
!  
!  
!  
!  
!  
!  
!  
interface Ethernet0  
 ip address 10.50.50.5 255.255.255.0  
 no ip route-cache  
 bridge-group 59  
 bridge-group 59 spanning-disabled  
!  
interface cable-modem0  
 ip address docsis  
 no ip route-cache  
 no ip mroute-cache  
 bridge-group 59  
 bridge-group 59 spanning-disabled  
!  
ip classless  
no ip http server  
no ip http cable-monitor  
!  
snmp-server packetsize 4096  
snmp-server manager  
!  
voice-port 0  
  input gain -2  
!  
voice-port 1  
  input gain -2  
!  
dial-peer voice 3 pots  
  destination-pattern 3333  
  
!--- Local phone number. Remote cable modem calls this number.  
  
port 0
```

```

!
dial-peer voice 30 voip
  destination-pattern 1...

  !--- Called number starting with 1 and
  !--- followed by three additional digits should be sent
  !--- to gateway with IP address 10.50.50.2.
  !--- In this example, the Psyduck cable modem.

session target ipv4:10.50.50.2
!
!
line con 0
  exec-timeout 0 0
  transport input none
line vty 0 4
  login
!
end

```

### Sniper (CMTS)

```

Sniper#wr t
Building configuration...

Current configuration : 2389 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
service udp-small-servers max-servers no-limit
!
hostname Sniper
!
boot system flash slot0:ubr7200-ik1st-mz.121-5.T.bin
logging rate-limit console 10 except errors
enable password cisco
!
no cable qos permission create
no cable qos permission update
cable qos permission modems
cable time-server
ip subnet-zero
no ip finger
no ip domain-lookup
!
!
!
!
!
interface FastEthernet0/0
  description Connection to lab backbone
  ip address 172.17.110.148 255.255.255.224
  half-duplex
!
interface Ethernet1/0
  no ip address
  shutdown
  half-duplex
!
interface Ethernet1/1
  no ip address

```

```
shutdown
half-duplex
!
interface Ethernet1/2
no ip address
shutdown
half-duplex
!
interface Ethernet1/3
no ip address
shutdown
half-duplex
!
interface Ethernet1/4
no ip address
shutdown
half-duplex
!
interface Ethernet1/5
no ip address
shutdown
half-duplex

!
interface Ethernet1/6
no ip address
shutdown
half-duplex
!
interface Ethernet1/7
no ip address
shutdown
half-duplex
!
interface Cable2/0
ip address 192.168.50.1 255.255.255.0 secondary
ip address 10.50.50.1 255.255.255.0
no keepalive
cable downstream annex B
cable downstream modulation 64qam
cable downstream interleave-depth 32
cable downstream frequency 555000000
cable upstream 0 frequency 30000000
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 172.17.110.137
!
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
```

```

!
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 4
  exec-timeout 0 0
  no login
!
end

```

## Verify

Before attempting any of the below debug commands, refer to Important Information on Debug Commands.

### show Commands

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

The **show** commands listed below can be run to verify correct operation.

#### On the uBR924

```
Raichu#show voice port summary
```

PORT	CH	SIG-TYPE	ADMIN	OPER	IN STATUS	OUT STATUS	EC
0	--	fxs-ls	up	up	off-hook	idle	y
1	--	fxs-ls	up	dorm	on-hook	idle	y

```
Raichu#show dial-peer voice summary
```

```
dial-peer hunt 0
```

TAG	TYPE	ADMIN	OPER	PREFIX	DEST-PATTERN	PASS	PREF	THRU	SESS-TARGET	PORT
3	pots	up	up		3333		0			0
30	voip	up	up		1...		0	syst	ipv4:10.50.50.2	

Another useful command is **show call active voice brief**. At the end of the command output, check for Total call-legs. A sample of the lower portion of the output is shown below.

```
Total call-legs: 2
```

```
CB : 8347953hs.1 +141 pid:30 Answer 1111 active
```

```
dur 00:14:50 tx:44601/891991 rx:44530/890571
```

```
IP 10.50.50.2:0 rtt:17ms pl:883120/4360ms lost:0/0/226 delay:26/22/126ms g729r8
```

```
CB : 8347954hs.1 +140 pid:3 Originate 3333 active
```

```
dur 00:14:51 tx:44583/891631 rx:44653/893031
```

```
Tele 0 (65): tx:893140/893050/0ms g729r8 noise:-20 acom:0 i/0:-30/-34 dBm
```

Other useful commands are **show voice port x** and **show dialplan number ###** .

## debug Commands

The most commonly used debug commands for VoIP are listed below.

- **debug voip ccapi inout**
- **debug cch323 h225**
- **debug cch323 h245**

For more information, refer to [Verify End-to-End VoIP Signaling \(VOIP Call-Leg\)](#).

### On the CMTS

```
Sniper#show cable modem
Interface Prim Online Timing Rec QoS CPE IP address MAC address
          Sid State Offset Power
Cable2/0/U0 1 online 2286 0.25 5 0 10.50.50.4 0050.7366.2223
Cable2/0/U0 2 online 2812 0.00 5 0 10.50.50.5 0001.9659.4449
Cable2/0/U0 3 online 2814 0.00 5 0 10.50.50.2 0001.9659.4477
```

```
Sniper#show interfaces cable 2/0 modem 0
SID Priv bits Type State IP address method MAC address
1 00 modem up 10.50.50.4 dhcp 0050.7366.2223
2 00 modem up 10.50.50.5 dhcp 0001.9659.4449
3 00 modem up 10.50.50.2 dhcp 0001.9659.4477
```

## Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

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## Related Information

- **Cable Modem Voice Configuration Using H323v2 Dynamic Mapping with Gatekeeper**
- **Troubleshooting and Debugging VoIP Call Basics**
- **Broadband Cable Technology Support**
- **Voice Technology Support**
- **Troubleshooting uBR Cable Modems Not Coming Online**
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