

用浮动静态路由配置 ISDN 备份

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简介

本文档为使用浮动静态路由实现 ISDN 备份提供了配置示例，并为这类配置提供基本的故障排除信息。

要获得关于最常见的ISDN备份的实施的实施的信息，以及它们之间的比较，请参见以下文件：[Backup Interface、浮动静态路由和拨号程序监视DDR备份。](#)

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本。

- 运行 Cisco IOS® 软件版本 12.2(3) 和 12.2(5) 的两个 Cisco 2500 路由器

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

配置

本部分提供有关如何配置本文档所述功能的信息。

注意：要查找有关本文档中所使用命令的其他信息，请使用 [命令查询工具](#)（[仅限注册用户](#)）。

网络图

本文档使用下图所示的网络设置。

配置

本文档使用如下所示的配置。

- [krimson \(Cisco 2500 路由器\)](#)
- [kevin \(Cisco 2500 路由器\)](#)

[krimson \(Cisco 2500 路由器\)](#)

```
krimson#show running-config Building configuration... !  
version 12.2 service timestamps debug datetime msec  
service timestamps log datetime msec ! hostname krimson  
! username kevin password 0 <password> ! isdn switch-  
type basic-net3 ! ! interface Loopback0 ip address  
10.7.7.1 255.255.255.0 ! interface Serial0 ip address  
10.1.2.1 255.255.255.0 ! interface BRI0 no ip address  
encapsulation ppp no ip route-cache no ip mroute-cache  
load-interval 30 dialer pool-member 1 isdn switch-type  
basic-net3 no fair-queue no cdp enable ppp  
authentication chap ! interface Dialer0 ip address  
10.9.9.1 255.255.255.0 encapsulation ppp no ip route-  
cache no ip mroute-cache dialer pool 1 dialer remote-  
name kevin dialer string 8114 dialer-group 1 no cdp  
enable ppp authentication chap ! ip classless ip route  
10.8.8.0 255.255.255.0 10.1.2.2 ip route 10.8.8.0  
255.255.255.0 10.9.9.2 180 no ip http server ! dialer-  
list 1 protocol ip permit ! ! line con 0 exec-timeout 0  
0 line aux 0 line vty 0 4 exec-timeout 0 0 password  
<password> login ! end
```

[kevin \(Cisco 2500 路由器\)](#)

```
kevin#show running-config Building configuration...  
Current configuration : 1205 bytes ! version 12.2  
service timestamps debug datetime msec service  
timestamps log datetime msec no service password-  
encryption ! hostname kevin ! username krimson password  
0 <password> ! isdn switch-type basic-net3 ! ! !  
interface Loopback0 ip address 10.8.8.1 255.255.255.0 !  
interface Serial0 ip address 10.1.2.2 255.255.255.0  
clockrate 2000000 ! interface Serial1 no ip address  
shutdown ! interface BRI0 no ip address encapsulation  
ppp dialer pool-member 1 isdn switch-type basic-net3 no  
cdp enable ppp authentication chap ! interface Dialer0  
ip address 10.9.9.2 255.255.255.0 encapsulation ppp  
dialer pool 1 dialer remote-name krimson dialer string  
8113 dialer-group 1 no cdp enable ppp authentication
```

```
chap !! dialer-list 1 protocol ip permit !! line con 0
exec-timeout 0 0 line aux 0 line vty 0 4 exec-timeout 0
0 password <password> login ! end
```

验证

本部分所提供的信息可用于确认您的配置是否正常工作。

[命令输出解释程序工具 \(仅限注册用户 \) 支持某些 show 命令，使用此工具可以查看对 show 命令输出的分析。](#)

- **show ip route** - 显示IP 路由表条目。
- **show interfaces** - 显示在路由器或接入服务器上配置的所有接口的统计信息。

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除命令

[命令输出解释程序工具 \(仅限注册用户 \) 支持某些 show 命令，使用此工具可以查看对 show 命令输出的分析。](#)

注意： 在发出 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- **debug isdn q931** - 显示关于呼叫建立及拆线、本地路由器(用户端)和网络之间的ISDN网络连接 (第三层)断开的信息。
- **debug isdn events** - 显示发生在 ISDN 接口用户端 (在路由器上) 的 ISDN 事件。这些可以显示的 ISDN 事件是 Q.931 事件 (ISDN 网络连接的呼叫建立和断开)。
- **debug dialer** - 显示拨号程序接口上数据包或事件的相关调试信息。
- **debug ppp negotiation** - 导致**debug ppp**命令显示PPP启动期间传输的PPP信息包，其中PPP选项需要协商。
- **debug ppp authentication** - 致使**debug ppp**命令显示认证协议消息，包括质询验证协议 (CHAP)信息包交换和密码验证协议(PAP)交换。

故障排除输出示例

在此，我们可以通过在远端的串行接口上使用 **shutdown** 和 **no shutdown** 命令来测试备份功能。这会导致相关目标网络中主 IP 路由的消失。

首先让我们看看主接口和 IP 路由表的初始状态：

呼叫端：

```
krimson#show interface serial 0 Serial0 is up, line protocol is up Hardware is HD64570
Internet address is 10.1.2.1/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability
255/255, txload 1/255, rxload 1/255 Encapsulation HDLC, loopback not set Keepalive set (10 sec)
Last input 00:00:07, output 00:00:07, output hang never Last clearing of "show interface"
counters never Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing
strategy: weighted fair Output queue: 0/1000/64/0 (size/max total/threshold/drops) Conversations
```

```
0/1/256 (active/max active/max total) Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 1158 kilobits/sec 5 minute input rate 1000 bits/sec, 0 packets/sec 5 minute
output rate 0 bits/sec, 0 packets/sec 92 packets input, 7599 bytes, 0 no buffer Received 62
broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored,
0 abort 99 packets output, 8991 bytes, 0 underruns 0 output errors, 0 collisions, 12 interface
resets 0 output buffer failures, 0 output buffers swapped out 4 carrier transitions DCD=up
DSR=up DTR=up RTS=up CTS=up krimson#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 10.48.74.1 to network 0.0.0.0 10.0.0.0/8 is variably subnetted,
5 subnets, 2 masks C 10.1.2.0/24 is directly connected, Serial0 S 10.8.8.0/24 [1/0] via 10.1.2.2
!--- The IP route for the destination network points to the primary link. C 10.9.9.0/24 is
directly connected, Dialer0 C 10.7.7.0/24 is directly connected, Loopback0 C 10.48.74.0/23 is
directly connected, Ethernet0 S* 0.0.0.0/0 [254/0] via 10.48.74.1
```

被呼叫端：

```
kevin#show interface serial 0 Serial0 is up, line protocol is up Hardware is HD64570 Internet
address is 10.1.2.2/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload
1/255, rxload 1/255 Encapsulation HDLC, loopback not set Keepalive set (10 sec) Last input
00:00:00, output 00:00:08, output hang never Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing strategy:
weighted fair Output queue: 0/1000/64/0 (size/max total/threshold/drops) Conversations 0/1/256
(active/max active/max total) Reserved Conversations 0/0 (allocated/max allocated) Available
Bandwidth 1158 kilobits/sec 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0
bits/sec, 0 packets/sec 106 packets input, 9432 bytes, 0 no buffer Received 71 broadcasts, 0
runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 98
packets output, 8016 bytes, 0 underruns 0 output errors, 0 collisions, 4 interface resets 0
output buffer failures, 0 output buffers swapped out 1 carrier transitions DCD=up DSR=up DTR=up
RTS=up CTS=up kevin#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 10.48.74.1 to network 0.0.0.0 10.0.0.0/8 is variably subnetted, 4
subnets, 2 masks C 10.1.2.0/24 is directly connected, Serial0 C 10.9.9.0/24 is directly
connected, Dialer0 C 10.8.8.0/24 is directly connected, Loopback0 C 10.48.74.0/23 is directly
connected, Ethernet0 S* 0.0.0.0/0 [254/0] via 10.48.74.1 kevin#
```

现在，我们可以通过在远程串行接口上使用 **shutdown** 命令来模拟链路故障：

```
krimson#
*Mar 4 15:25:18.302: %LINK-3-UPDOWN: Interface Serial0, changed state to
down
*Mar 4 15:25:19.302: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0, changed state to down
```

在此，我们可以看到主链路已经断开。

```
krimson#show interface serial 0 Serial0 is down, line protocol is down Hardware is HD64570
Internet address is 10.1.2.1/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability
255/255, txload 1/255, rxload 1/255 Encapsulation HDLC, loopback not set Keepalive set (10 sec)
Last input 00:00:22, output 00:00:32, output hang never Last clearing of "show interface"
counters never Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing
strategy: weighted fair Output queue: 0/1000/64/0 (size/max total/threshold/drops) Conversations
0/1/256 (active/max active/max total) Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 1158 kilobits/sec 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute
output rate 0 bits/sec, 0 packets/sec 108 packets input, 8526 bytes, 0 no buffer Received 78
broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored,
0 abort 114 packets output, 9895 bytes, 0 underruns 0 output errors, 0 collisions, 12 interface
resets 0 output buffer failures, 0 output buffers swapped out 5 carrier transitions DCD=down
DSR=down DTR=up RTS=up CTS=down krimson#
```

路由表详细信息此时显示路由表中已安装浮动静态路由：

```
krimson#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 10.48.74.1 to network 0.0.0.0 10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks S 10.8.8.0/24 [180/0] via 10.9.9.2 C 10.9.9.0/24 is directly connected, Dialer0 C 10.7.7.0/24 is directly connected, Loopback0 C 10.48.74.0/23 is directly connected, Ethernet0 S* 0.0.0.0/0 [254/0] via 10.48.74.1 krimson#
```

在被叫路由器上，我们可以通过在本地串行 0 接口上使用 **shutdown** 命令来模拟主链路故障：

```
kevin#configure terminal Enter configuration commands, one per line. End with CNTL/Z. kevin(config)#interface serial 0 kevin(config-if)#shutdown *Mar 4 15:32:00.250: %LINK-5-CHANGED: Interface Serial0, changed state to administratively down *Mar 4 15:32:01.250: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0, changed state to down *Mar 4 15:32:03.742: %SYS-5-CONFIG_I: Configured from console by console
```

现在，我们可以看到主链路已经断开：

```
kevin#show interface serial 0 Serial0 is administratively down, line protocol is down Hardware is HD64570 Internet address is 10.1.2.2/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation HDLC, loopback not set Keepalive set (10 sec) Last input 00:01:28, output 00:01:18, output hang never Last clearing of "show interface" counters never Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing strategy: weighted fair Output queue: 0/1000/64/0 (size/max total/threshold/drops) Conversations 0/1/256 (active/max active/max total) Reserved Conversations 0/0 (allocated/max allocated) Available Bandwidth 1158 kilobits/sec 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 114 packets input, 9895 bytes, 0 no buffer Received 79 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 108 packets output, 8526 bytes, 0 underruns 0 output errors, 0 collisions, 4 interface resets 0 output buffer failures, 0 output buffers swapped out 1 carrier transitions DCD=down DSR=down DTR=up RTS=up CTS=down
```

被定义为相关流量的 ping 流量会通过备份拨号程序 0 接口启动呼出呼叫。

```
krimson#ping 10.8.8.1 Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to 10.8.8.1, timeout is 2 seconds: *Mar 4 15:27:39.618: BR0 DDR: rotor dialout [priority] *Mar 4 15:27:39.622: BR0 DDR: Dialing cause ip (s=10.9.9.1, d=10.8.8.1) *Mar 4 15:27:39.626: BR0 DDR: Attempting to dial 8114 *Mar 4 15:27:39.642: ISDN BR0: TX -> SETUP pd = 8 callref = 0x09 *Mar 4 15:27:39.646: Bearer Capability i = 0x8890 *Mar 4 15:27:39.654: Channel ID i = 0x83 *Mar 4 15:27:39.658: Called Party Number i = 0x80, '8114', Plan:Unknown, Type:Unknown *Mar 4 15:27:39.718: ISDN BR0: RX <- CALL_PROC pd = 8 callref = 0x89 *Mar 4 15:27:39.722: Channel ID i = 0x89 *Mar 4 15:27:39.974: ISDN BR0: RX <- CONNECT pd = 8 callref = 0x89 *Mar 4 15:27:39.990: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up *Mar 4 15:27:39.998: %DIALER-6-BIND: Interface BR0:1 bound to profile Di0 *Mar 4 15:27:40.010: BR0:1 PPP: Treating connection as a callout *Mar 4 15:27:40.010: BR0:1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] *Mar 4 15:27:40.014: BR0:1 LCP: O .!!!CONFREQ [Closed] id 19 len 15 *Mar 4 15:27:40.018: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 15:27:40.022: BR0:1 LCP: MagicNumber 0x12D0A490 (0x050612D0A490) *Mar 4 15:27:40.030: ISDN BR0: TX -> CONNECT_ACK pd = 8 callref = 0x09 *Mar 4 15:27:40.054: BR0:1 LCP: I CONFREQ [REQsent] id 9 len 15 *Mar 4 15:27:40.058: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 15:27:40.062: BR0:1 LCP: MagicNumber 0x12D6B638 (0x050612D6B638) *Mar 4 15:27:40.066: BR0:1 LCP: O CONFACK [REQsent] id 9 len 15 *Mar 4 15:27:40.066: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 15:27:40.070: BR0:1 LCP: MagicNumber 0x12D6B638 (0x050612D6B638) *Mar 4 15:27:40.074: BR0:1 LCP: I CONFACK [ACKsent] id 19 len 15 *Mar 4 15:27:40.078: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 15:27:40.082: BR0:1 LCP: MagicNumber 0x12D0A490 (0x050612D0A490) *Mar 4 15:27:40.082: BR0:1 LCP: State is Open *Mar 4 15:27:40.086: BR0:1 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] *Mar 4 15:27:40.090: BR0:1 CHAP: O CHALLENGE id 7 len 28 from "krimson" *Mar 4 15:27:40.106: BR0:1 CHAP: I CHALLENGE id 7 len 26 from "kevin" *Mar 4 15:27:40.110: BR0:1 CHAP: O RESPONSE id 7 len 28 from "krimson" *Mar 4 15:27:40.138: BR0:1 CHAP: I SUCCESS id 7 len 4 *Mar 4 15:27:40.150: BR0:1 CHAP: I RESPONSE id 7 len 26 from "kevin" *Mar 4 15:27:40.158: BR0:1 CHAP: O SUCCESS id 7 len 4 *Mar 4 15:27:40.162: BR0:1 PPP: Phase is UP [0 sess, 0 load] *Mar 4 15:27:40.166: BR0:1
```

```
IPCP: O CONFREQ [Not negotiated] id 2 len 10 *Mar 4 15:27:40.170: BR0:1 IPCP: Address 10.9.9.1
(0x03060A090901) *Mar 4 15:27:40.186: BR0:1 IPCP: I CONFREQ [REQsent] id 2 len 10 *Mar 4
15:27:40.190: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902) *Mar 4 15:27:40.190: BR0:1 IPCP: O
CONFACK [REQsent] id 2 len 10 *Mar 4 15:27:40.194: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902)
*Mar 4 15:27:40.202: BR0:1 IPCP: I CONFACK [ACKsent] id 2 len 10 *Mar 4 15:27:40.206: BR0:1
IPCP: Address 10.9.9.1 (0x03060A090901) *Mar 4 15:27:40.206: BR0:1 IPCP: State is Open *Mar 4
15:27:40.214: BR0:1 DDR: dialer protocol up *Mar 4 15:27:40.218: Di0 IPCP: Install route to
10.9.9.2 *Mar 4 15:27:41.162: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1, changed
state to upcss rate is 80 percent (4/5), round-trip min/avg/max = 36/47/76 ms krimson#
```

同时，在被呼叫端运行的 debug 会显示此同一呼叫的以下输出：

```
kevin#
*Mar 4 15:34:21.698: ISDN BR0: RX <- SETUP pd = 8 callref = 0x07
*Mar 4 15:34:21.706: Bearer Capability i = 0x8890
*Mar 4 15:34:21.714: Channel ID i = 0x89
*Mar 4 15:34:21.718: Calling Party Number i = 0xA1, '8113',
Plan:ISDN, Type:National
*Mar 4 15:34:21.734: Called Party Number i = 0xC1, '8114',
Plan:ISDN, Type:Subscriber(local)
*Mar 4 15:34:21.762: ISDN BR0: Event: Received a DATA call from 8113 on B1
at 64 Kb/s
*Mar 4 15:34:21.762: ISDN BR0: Event: Accepting the call id 0xC
*Mar 4 15:34:21.766: BR0:1: interface must be fifo queue, force fifo
*Mar 4 15:34:21.774: %DIALER-6-BIND: Interface BR0:1 bound to profile Di0
*Mar 4 15:34:21.786: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
*Mar 4 15:34:21.798: BR0:1 PPP: Treating connection as a callin
*Mar 4 15:34:21.802: BR0:1 PPP: Phase is ESTABLISHING, Passive Open [0 sess,
0 load]
*Mar 4 15:34:21.806: BR0:1 LCP: State is Listen
*Mar 4 15:34:21.818: ISDN BR0: TX -> CALL_PROC pd = 8 callref = 0x87
*Mar 4 15:34:21.826: Channel ID i = 0x89
*Mar 4 15:34:21.854: ISDN BR0: TX -> CONNECT pd = 8 callref = 0x87
*Mar 4 15:34:21.918: ISDN BR0: RX <- CONNECT_ACK pd = 8 callref = 0x07
*Mar 4 15:34:21.926: Channel ID i = 0x89
*Mar 4 15:34:21.978: BR0:1 LCP: I CONFREQ [Listen] id 19 len 15
*Mar 4 15:34:21.982: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Mar 4 15:34:21.986: BR0:1 LCP: MagicNumber 0x12D0A490 (0x050612D0A490)
*Mar 4 15:34:21.990: BR0:1 LCP: O CONFREQ [Listen] id 9 len 15
*Mar 4 15:34:21.994: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Mar 4 15:34:21.994: BR0:1 LCP: MagicNumber 0x12D6B638 (0x050612D6B638)
*Mar 4 15:34:21.998: BR0:1 LCP: O CONFACK [Listen] id 19 len 15
*Mar 4 15:34:22.002: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Mar 4 15:34:22.006: BR0:1 LCP: MagicNumber 0x12D0A490 (0x050612D0A490)
*Mar 4 15:34:22.030: BR0:1 LCP: I CONFACK [ACKsent] id 9 len 15
*Mar 4 15:34:22.034: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Mar 4 15:34:22.034: BR0:1 LCP: MagicNumber 0x12D6B638 (0x050612D6B638)
*Mar 4 15:34:22.038: BR0:1 LCP: State is Open
*Mar 4 15:34:22.042: BR0:1 PPP: Phase is AUTHENTICATING, by both [0 sess, 0
load]
*Mar 4 15:34:22.046: BR0:1 CHAP: O CHALLENGE id 7 len 26 from "kevin"
*Mar 4 15:34:22.050: BR0:1 CHAP: I CHALLENGE id 7 len 28 from "krimson"
*Mar 4 15:34:22.054: BR0:1 CHAP: Waiting for peer to authenticate first
*Mar 4 15:34:22.070: BR0:1 CHAP: I RESPONSE id 7 len 28 from "krimson"
*Mar 4 15:34:22.078: BR0:1 CHAP: O SUCCESS id 7 len 4
*Mar 4 15:34:22.082: BR0:1 CHAP: Processing saved Challenge, id 7
*Mar 4 15:34:22.090: BR0:1 CHAP: O RESPONSE id 7 len 26 from "kevin"
*Mar 4 15:34:22.114: BR0:1 CHAP: I SUCCESS id 7 len 4
*Mar 4 15:34:22.118: BR0:1 PPP: Phase is UP [0 sess, 0 load]
*Mar 4 15:34:22.122: BR0:1 IPCP: O CONFREQ [Not negotiated] id 2 len 10
*Mar 4 15:34:22.126: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902)
*Mar 4 15:34:22.130: BR0:1 IPCP: I CONFREQ [REQsent] id 2 len 10
*Mar 4 15:34:22.134: BR0:1 IPCP: Address 10.9.9.1 (0x03060A090901)
*Mar 4 15:34:22.138: BR0:1 IPCP: O CONFACK [REQsent] id 2 len 10
```

```

*Mar 4 15:34:22.142: BR0:1 IPCP: Address 10.9.9.1 (0x03060A090901)
*Mar 4 15:34:22.226: BR0:1 IPCP: I CONFACK [ACKsent] id 2 len 10
*Mar 4 15:34:22.230: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902)
*Mar 4 15:34:22.230: BR0:1 IPCP: State is Open
*Mar 4 15:34:22.242: BR0:1 DDR: dialer protocol up
*Mar 4 15:34:22.250: Di0 IPCP: Install route to 10.9.9.1
*Mar 4 15:34:23.114: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to up
*Mar 4 15:34:27.794: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to
8113 krimson

```

备份之后的状态为“up”：

```

krimson#show interface dialer 0 Dialer0 is up, line protocol is up (spoofing) Hardware is
Unknown Internet address is 10.9.9.1/24 MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec, reliability
255/255, txload 1/255, rxload 1/255 Encapsulation PPP, loopback not set DTR is pulsed for 1
seconds on reset Interface is bound to BR0:1 Last input never, output never, output hang never
Last clearing of "show interface" counters 00:13:26 Input queue: 0/75/0/0
(size/max/drops/flushes); Total output drops: 0 Queueing strategy: weighted fair Output queue:
0/1000/64/0 (size/max total/threshold/drops) Conversations 0/1/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated) Available Bandwidth 42 kilobits/sec 5
minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 36
packets input, 2160 bytes 36 packets output, 2160 bytes Bound to: BRI0:1 is up, line protocol is
up Hardware is BRI MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, reliability 255/255, txload
1/255, rxload 1/255 Encapsulation PPP, loopback not set Keepalive set (10 sec) Time to interface
disconnect: idle 00:01:33 Interface is bound to Di0 (Encapsulation PPP) LCP Open Open: IPCP Last
input 00:00:26, output 00:00:01, output hang never Last clearing of "show interface" counters
never Queueing strategy: fifo Output queue 0/40, 0 drops; input queue 0/75, 0 drops 30 second
input rate 0 bits/sec, 0 packets/sec 30 second output rate 0 bits/sec, 0 packets/sec 126 packets
input, 3664 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input
errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 131 packets output, 3777 bytes, 0
underruns 0 output errors, 0 collisions, 15 interface resets 0 output buffer failures, 0 output
buffers swapped out 28 carrier transitions krimson#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 10.48.74.1 to network 0.0.0.0
10.0.0.0/8 is variably subnetted, 5 subnets, 3 masks C 10.9.9.2/32 is directly connected,
Dialer0 S 10.8.8.0/24 [180/0] via 10.9.9.2 C 10.9.9.0/24 is directly connected, Dialer0 C
10.7.7.0/24 is directly connected, Loopback0 C 10.48.74.0/23 is directly connected, Ethernet0 S*
0.0.0.0/0 [254/0] via 10.48.74.1

```

[在被呼叫端：](#)

备份之后的状态为“up”。

```

kevin#show interface dialer 0 Dialer0 is up, line protocol is up (spoofing) Hardware is
Unknown Internet address is 10.9.9.2/24 MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec, reliability
255/255, txload 1/255, rxload 1/255 Encapsulation PPP, loopback not set DTR is pulsed for 1
seconds on reset Interface is bound to BR0:1 Last input never, output never, output hang never
Last clearing of "show interface" counters 00:16:18 Input queue: 0/75/0/0
(size/max/drops/flushes); Total output drops: 0 Queueing strategy: weighted fair Output queue:
0/1000/64/0 (size/max total/threshold/drops) Conversations 0/1/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated) Available Bandwidth 42 kilobits/sec 5
minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 40
packets input, 2224 bytes 40 packets output, 2224 bytes Bound to: BRI0:1 is up, line protocol is
up Hardware is BRI MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, reliability 255/255, txload
1/255, rxload 1/255 Encapsulation PPP, loopback not set Keepalive set (10 sec) Time to interface
disconnect: idle 00:01:11 Interface is bound to Di0 (Encapsulation PPP) LCP Open Open: IPCP Last
input 00:00:48, output 00:00:00, output hang never Last clearing of "show interface" counters
never Queueing strategy: fifo Output queue 0/40, 0 drops; input queue 0/75, 0 drops 5 minute
input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 136 packets
input, 3857 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input

```

errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 131 packets output, 3744 bytes, 0 underruns 0 output errors, 0 collisions, 12 interface resets 0 output buffer failures, 0 output buffers swapped out 35 carrier transitions kevin#**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 10.48.74.1 to network 0.0.0.0 10.0.0.0/8 is variably subnetted, 4 subnets, 3 masks C 10.9.9.0/24 is directly connected, Dialer0 C 10.8.8.0/24 is directly connected, Loopback0 C 10.9.9.1/32 is directly connected, Dialer0 C 10.48.74.0/23 is directly connected, Ethernet0 S* 0.0.0.0/0 [254/0] via 10.48.74.1

在此，我们可以通过在远程串行接口上使用 **no shutdown** 命令来模拟主链路的恢复：

```
krimson#
*Mar 4 15:28:58.726: %LINK-3-UPDOWN: Interface Serial0, changed state to up
*Mar 4 15:28:59.730: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0, changed state to up
```

备份会在空闲超时之后断开。

```
krimson#show isdn active -----
----- ISDN ACTIVE CALLS -----
----- Call Calling Called Remote Seconds Seconds Seconds Charges Type Number Number
Name Used Left Idle Units/Currency -----
----- Out 8114 kevin 120 1 118 0 -----
----- krimson# *Mar 4 15:29:41.738: BR0:1 DDR: idle timeout *Mar 4
15:29:41.742: BR0 DDR: has total 0 call(s), dial_out 0, dial_in 0 *Mar 4 15:29:41.746: BR0:1
PPP: Treating connection as a callout *Mar 4 15:29:41.750: %DIALER-6-UNBIND: Interface BR0:1
unbound from profile Di0 *Mar 4 15:29:41.754: BR0:1 DDR: disconnecting call *Mar 4 15:29:41.758:
%ISDN-6-DISCONNECT: Interface BRI0:1 disconnected from 8114 kevin, call lasted 121 seconds *Mar
4 15:29:41.774: ISDN BR0: TX -> DISCONNECT pd = 8 callref = 0x09 *Mar 4 15:29:41.782: Cause i =
0x8090 - Normal call clearing *Mar 4 15:29:41.790: Di0 IPCP: Remove route to 10.9.9.2 *Mar 4
15:29:41.862: ISDN BR0: RX <- RELEASE pd = 8 callref = 0x89 *Mar 4 15:29:41.886: %LINK-3-UPDOWN:
Interface BRI0:1, changed state to down *Mar 4 15:29:41.894: BR0:1 IPCP: State is Closed *Mar 4
15:29:41.894: BR0:1 PPP: Phase is TERMINATING [0 sess, 0 load] *Mar 4 15:29:41.898: BR0:1 LCP:
State is Closed *Mar 4 15:29:41.898: BR0:1 PPP: Phase is DOWN [0 sess, 0 load] *Mar 4
15:29:41.902: BR0:1 DDR: disconnecting call *Mar 4 15:29:41.910: ISDN BR0: TX -> RELEASE_COMP pd
= 8 callref = 0x09 *Mar 4 15:29:42.886: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to down
```

现在，初始状态已经恢复。

```
krimson#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 10.48.74.1 to network 0.0.0.0 10.0.0.0/8 is variably subnetted, 5 subnets, 2 masks C
10.1.2.0/24 is directly connected, Serial0 S 10.8.8.0/24 [1/0] via 10.1.2.2 C 10.9.9.0/24 is
directly connected, Dialer0 C 10.7.7.0/24 is directly connected, Loopback0 C 10.48.74.0/23 is
directly connected, Ethernet0 S* 0.0.0.0/0 [254/0] via 10.48.74.1
```

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