# 使用备份接口的 BRI ISDN 备份

## 目录



## 简介

本文为ISDN备份提供了配置示例，同时提供了关于这类配置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前提条件。

### 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(帧中继数据终端设备[DTEs])。
- 作为帧中继交换机的Cisco 4500一个路由器。

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。

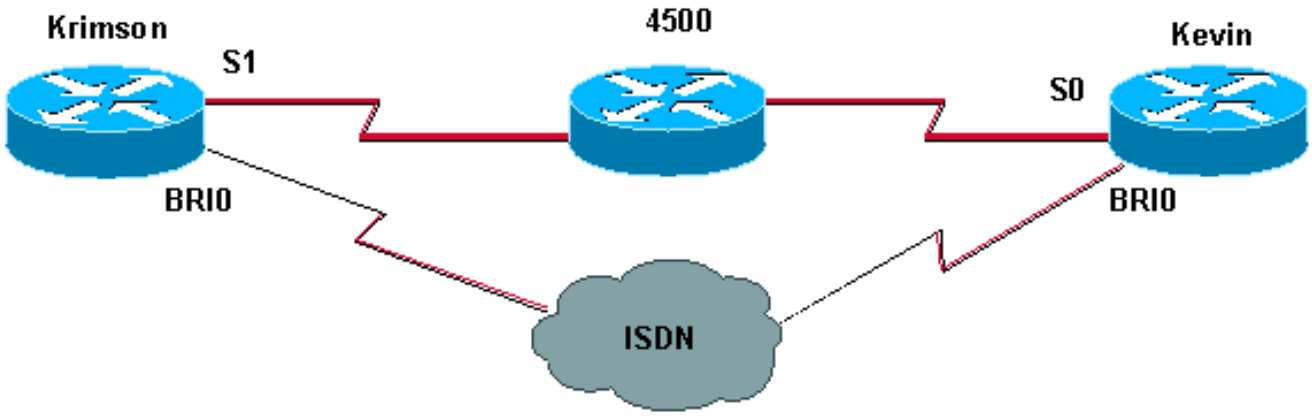
# 配置

本部分提供有关如何配置本文档所述功能的信息。

**注意：** 要查找本文档所用命令的其他信息，请使用命令查找工具（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)**

```
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 ip ospf network point-to-point ! interface Ethernet0 ip address 10.200.16.30 255.255.255.0 ! interface Serial1 bandwidth 64 no ip address encapsulation frame-relay no ip route-cache no ip mroute-cache ! interface Serial1.1 point-to-point backup interface Dialer0 ip address 10.5.5.2 255.255.255.0 no ip route-cache frame-relay interface-dlci 20 ! interface BRI0 description Testanschluss ISDN(intern), Nr. 4420038 no ip address encapsulation ppp no ip route-cache no ip mroute-cache load-interval 30 no keepalive 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 6120 dialer-group 1 no cdp enable ppp authentication chap ! router ospf 10 log-adjacency-changes network 10.5.5.0 0.0.0.255 area 0 network 10.7.7.0 0.0.0.255 area 0 network 10.9.9.0
```

```
0.0.0.255 area 0 ! ip default-gateway 10.200.16.1 no ip
classless no ip http server ! access-list 105 permit ip
any host 10.7.7.1 access-list 105 permit ip any host
10.8.8.1 access-list 105 permit ip any any dialer-list 1
protocol ip permit ! line con 0 exec-timeout 0 0
privilege level 15 line aux 0 transport input all line
vty 0 4 exec-timeout 0 0 password <password> login ! end
```

**kevin（Cisco 2500 路由器）**

```
kevin#show running-config Building configuration...
version 12.2 service timestamps debug datetime msec
service timestamps log datetime msec ! hostname kevin !
! username krimson password 0 <password> ! isdn switch-
type basic-net3 ! ! interface Loopback0 ip address
10.8.8.1 255.255.255.0 ip ospf network point-to-point !
interface Loopback1 ip address 172.19.0.1
255.255.255.255 ! interface Ethernet0 ip address
10.200.16.26 255.255.255.0 ! interface Serial0 no ip
address encapsulation frame-relay ! interface Serial0.1
point-to-point ip address 10.5.5.1 255.255.255.0 no cdp
enable frame-relay interface-dlci 20 ! 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-group 1 no cdp enable ppp
authentication chap ! router ospf 10 log-adjacency-
changes network 10.5.5.0 0.0.0.255 area 0 network
10.8.8.0 0.0.0.255 area 0 network 10.9.9.0 0.0.0.255
area 0 ! ip default-gateway 10.200.16.1 ip classless !
dialer-list 1 protocol ip permit no cdp run ! line con 0
exec-timeout 0 0 line aux 0 modem InOut line vty 0 4
exec-timeout 0 0 password <password> login ! ntp clock-
period 17180102 ntp server 10.200.20.134 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。

请使用以下命令验证您的配置：

输出解释器工具支持某些 **show** 命令（只限于注册用户），通过它可以查看 show 命令输出的分析。

- show interfaces serial -显示关于组播数据链路连接标识符(DLCI)、接口上使用的DLCI、用于本地管理接口(LMI)的DLCI的信息。
- **show interface拨号程序**显示关于拨号接口的信息。
- **显示IP路由**显示IP路由条目。

```
krimson#show interface serial 1.1 ! --- The initial state before the simulated Frame Relay
network failure. ! --- The primary link is up and functional. Serial1.1 is up, line protocol is
up Hardware is HD64570 Internet address is 10.5.5.2/24 Backup interface Dialer0, failure delay 0
sec, secondary disable delay 0 sec MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, reliability
255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY krimson#show int dialer 0 ! ---
Initial state. The backup interface is in standby mode and inactive. Dialer0 is standby mode
(spoofing), line protocol is down (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 Last input 1w6d, output
never, output hang never Last clearing of "show interface" counters 6w4d 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 596 packets input, 48924 bytes 600 packets output, 49280 bytes 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 10.200.16.1 to network 0.0.0.0 192.168.64.0/30 is subnetted, 1 subnets C 192.168.64.0 is directly connected, Dialer4 10.0.0.0/24 is subnetted, 6 subnets O 10.9.9.0 [110/3347] via 10.5.5.1, 00:03:34, Serial1.1 O 10.8.8.0 [110/1563] via 10.5.5.1, 00:03:34, Serial1.1 *! --- The route to the tested destination network points to the ! --- still-active primary link.* C 10.5.5.0 is directly connected, Serial1.1 C 10.7.7.0 is directly connected, Loopback0 C 10.9.8.0 is directly connected, Dialer1 C 10.200.16.0 is directly connected, Ethernet0 S* 0.0.0.0/0 [1/0] via 10.200.16.1

这里，我们能看到帧中继接口断开。

krimson#
*Apr 16 23:56:47.840: %LINK-3-UPDOWN: Interface Serial1,
changed state to down
*Apr 16 23:56:47.848: OSPF: Interface Serial1.1 going Down

*! --- Here we have simulated a failure within the Frame Relay network. ! --- We can see what was conducted to the Frame Relay DTE router, ! --- and the subinterface going down.* *Apr 16 23:56:47.852: %OSPF-5-ADJCHG: Process 10, Nbr 172.19.0.1 on Serial1.1 from FULL to DOWN, Neighbor Down: Interface down or detached *Apr 16 23:56:48.736: BACKUP(Serial1.1): event = primary went down *Apr 16 23:56:48.740: BACKUP(Serial1.1): changed state to "waiting to backup" *Apr 16 23:56:48.744: BACKUP(Serial1.1): event = timer expired *Apr 16 23:56:48.748: Di0 DDR is shutdown, could not clear interface. *Apr 16 23:56:48.752: BACKUP(Serial1.1): secondary interface (Dialer0) made active *! --- The configured backup interface is active.* *Apr 16 23:56:48.752: BACKUP(Serial1.1): changed state to "backup mode" *Apr 16 23:56:48.756: OSPF: Interface Dialer0 going Up *Apr 16 23:56:48.760: BR0 DDR: rotor dialout [priority] *Apr 16 23:56:48.764: BR0 DDR: Dialing cause ip (s=10.9.9.1, d=224.0.0.5) *! --- OSPF packets trigger the call.* *Apr 16 23:56:48.768: BR0 DDR: Attempting to dial 6120 *Apr 16 23:56:48.784: ISDN BR0: TX -> SETUP pd = 8 callref = 0x3E *Apr 16 23:56:48.792: Bearer Capability i = 0x8890 *Apr 16 23:56:48.796: Channel ID i = 0x83 *Apr 16 23:56:48.804: Called Party Number i = 0x80, '6120', Plan:Unknown, Type:Unknown *Apr 16 23:56:48.844: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to down *Apr 16 23:56:48.884: ISDN BR0: RX <- CALL_PROC pd = 8 callref = 0xBE *Apr 16 23:56:48.892: Channel ID i = 0x89 *Apr 16 23:56:49.144: ISDN BR0: RX <- CONNECT pd = 8 callref = 0xBE *Apr 16 23:56:49.160: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up *Apr 16 23:56:49.168: %DIALER-6-BIND: Interface BR0:1 bound to profile Di0 *Apr 16 23:56:49.176: BR0:1 PPP: Treating connection as a callout *Apr 16 23:56:49.180: BR0:1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] *Apr 16 23:56:49.184: BR0:1 LCP: O CONFREQ [Closed] id 49 len 15 *Apr 16 23:56:49.188: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Apr 16 23:56:49.188: BR0:1 LCP: MagicNumber 0xF2143EDB (0x0506F2143EDB) *Apr 16 23:56:49.196: ISDN BR0: TX -> CONNECT_ACK pd = 8 callref = 0x3E *Apr 16 23:56:49.224: BR0:1 LCP: I CONFREQ [REQsent] id 83 len 15 *Apr 16 23:56:49.228: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Apr 16 23:56:49.232: BR0:1 LCP: MagicNumber 0x9ADACD69 (0x05069ADACD69) *Apr 16 23:56:49.236: BR0:1 LCP: O CONFACK [REQsent] id 83 len 15 *Apr 16 23:56:49.236: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Apr 16 23:56:49.240: BR0:1 LCP: MagicNumber 0x9ADACD69 (0x05069ADACD69) *Apr 16 23:56:49.244: BR0:1 LCP: I CONFACK [ACKsent] id 49 len 15 *Apr 16 23:56:49.248: BR0:1 LCP: AuthProto CHAP (0x0305C22305) *Apr 16 23:56:49.252: BR0:1 LCP: MagicNumber 0xF2143EDB (0x0506F2143EDB) *Apr 16 23:56:49.252: BR0:1 LCP: State is Open *Apr 16 23:56:49.256: BR0:1 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] *Apr 16 23:56:49.260: BR0:1 CHAP: O CHALLENGE id 49 len 28 from "krimson" *Apr 16 23:56:49.276: BR0:1 CHAP: I CHALLENGE id 51 len 26 from "kevin" *Apr 16 23:56:49.284: BR0:1 CHAP: O RESPONSE id 51 len 28 from "krimson" *Apr 16 23:56:49.332: BR0:1 CHAP: I SUCCESS id 51 len 4 *Apr 16 23:56:49.344: BR0:1 CHAP: I RESPONSE id 49 len 26 from "kevin" *Apr 16 23:56:49.352: BR0:1 CHAP: O SUCCESS id 49 len 4 *Apr 16 23:56:49.356: BR0:1 PPP: Phase is UP [0 sess, 0 load] *Apr 16 23:56:49.360: BR0:1 IPCP: O CONFREQ [Not negotiated] id 41 len 10 *Apr 16 23:56:49.364: BR0:1 IPCP: Address 10.9.9.1 (0x03060A090901) *Apr 16 23:56:49.376: BR0:1 IPCP: I CONFREQ [REQsent] id 29 len 10 *Apr 16 23:56:49.380: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902) *Apr 16 23:56:49.384: BR0:1 IPCP: O CONFACK [REQsent] id 29 len 10 *Apr 16 23:56:49.388: BR0:1 IPCP: Address 10.9.9.2 (0x03060A090902) *Apr 16 23:56:49.396: BR0:1 IPCP: I

CONFACK [ACKsent] id 41 len 10 *Apr 16 23:56:49.400: BR0:1 IPCP: Address 10.9.9.1 (0x03060A090901) *Apr 16 23:56:49.400: BR0:1 IPCP: State is Open *Apr 16 23:56:49.408: BR0:1 DDR: dialer protocol up *Apr 16 23:56:49.416: Di0 IPCP: Install route to 10.9.9.2 *Apr 16 23:56:49.960: OSPF: Rcv hello from 172.19.0.1 area 0 from Dialer0 10.9.9.2 *Apr 16 23:56:49.964: OSPF: End of hello processing *Apr 16 23:56:50.356: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1, changed state to up *Apr 16 23:56:50.748: %LINK-3-UPDOWN: Interface Dialer0, changed state to up *Apr 16 23:56:50.752: Di0 LCP: Not allowed on a Dialer Profile *Apr 16 23:56:50.752: BACKUP(Dialer0): event = primary came up *Apr 16 23:56:55.176: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to 6120 kevin *Apr 16 23:56:58.804: OSPF: Rcv DBD from 172.19.0.1 on Dialer0 seq 0x988 opt 0x42 flag 0x7 len 32 mtu 1500 state INIT *Apr 16 23:56:58.808: OSPF: 2 Way Communication to 172.19.0.1 on Dialer0, state 2WAY krimson#**show interface serial 1.1** Serial1.1 is down, line protocol is down *! --- The primary link is down.* Hardware is HD64570 Internet address is 10.5.5.2/24 Backup interface Dialer0, failure delay 0 sec, secondary disable delay 0 sec MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY krimson#**show interface dialer 0** Dialer0 is up, line protocol is up (spoofing) *! --- The backup interface is active and bearing traffic.* 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 1w6d, output never, output hang never Last clearing of "show interface" counters 6w4d 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 614 packets input, 50240 bytes 618 packets output, 50584 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 not set DTR is pulsed for 1 seconds on reset Time to interface disconnect: idle 00:01:57 Interface is bound to Di0 (Encapsulation PPP) LCP Open Open: IPCP Last input 00:00:01, output 00:00:02, 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 3910 packets input, 394443 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 29 input errors, 18 CRC, 0 frame, 0 overrun, 0 ignored, 11 abort 3613 packets output, 222417 bytes, 0 underruns 0 output errors, 0 collisions, 27 interface resets 0 output buffer failures, 0 output buffers swapped out 607 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 10.200.16.1 to network 0.0.0.0 192.168.64.0/30 is subnetted, 1 subnets C 192.168.64.0 is directly connected, Dialer4 10.0.0.0/8 is variably subnetted, 6 subnets, 2 masks C 10.9.9.2/32 is directly connected, Dialer0 O 10.8.8.0/24 [110/1786] via 10.9.9.2, 00:00:53, Dialer0 *! --- The route entry to the destination network is now pointing to ! --- the backup interface as a next hop.* C 10.9.9.0/24 is directly connected, Dialer0 C 10.7.7.0/24 is directly connected, Loopback0 C 10.9.8.0/24 is directly connected, Dialer1 C 10.200.16.0/24 is directly connected, Ethernet0 S* 0.0.0.0/0 [1/0] via 10.200.16.1 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: !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/40 ms

一旦帧中继网络的故障被排除，我们在这里可以看到系统重新回到初始状态。

krimson#**show interface serial 1.1** Serial1.1 is up, line protocol is up Hardware is HD64570 Internet address is 10.5.5.2/24 Backup interface Dialer0, failure delay 0 sec, secondary disable delay 0 sec MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY krimson#**show interface dialer 0** Dialer0 is standby mode (spoofing), line protocol is down (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 Last input 1w6d, output never, output hang never Last clearing of "show interface" counters 6w5d 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 665

packets input, 54008 bytes 671 packets output, 54548 bytes 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 10.200.16.1 to network 0.0.0.0 192.168.64.0/30 is subnetted, 1 subnets C 192.168.64.0 is directly connected, Dialer4 10.0.0.0/24 is subnetted, 6 subnets O 10.9.9.0 [110/3347] via 10.5.5.1, 00:08:39, Serial1.1 O 10.8.8.0 [110/1563] via 10.5.5.1, 00:08:39, Serial1.1 C 10.5.5.0 is directly connected, Serial1.1 C 10.7.7.0 is directly connected, Loopback0 C 10.9.8.0 is directly connected, Dialer1 C 10.200.16.0 is directly connected, Ethernet0 S* 0.0.0.0/0 [1/0] via 10.200.16.1 krimson#

**注意：** 特定配置在被呼叫端没有必要。

同样显示在正常操作时被记录的输出包含以下信息：

kevin#**show interface serial 0.1** Serial0.1 is up, line protocol is up *! --- The primary interface is up and running.* Hardware is HD64570 Internet address is 10.5.5.1/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY kevin#**show interface dialer 0** Dialer0 is up (spoofing), line protocol is up (spoofing) *! --- Note: On the called side, the dialer interface is active ! --- and not in standby mode.* 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 Last input 1w6d, output never, output hang never Last clearing of "show interface" counters 4w2d 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 598 packets input, 49252 bytes 596 packets output, 48924 bytes 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 10.200.16.1 to network 0.0.0.0 172.17.0.0/32 is subnetted, 1 subnets S 172.17.247.195 [1/0] via 10.200.16.1 172.19.0.0/32 is subnetted, 1 subnets C 172.19.0.1 is directly connected, Loopback1 10.0.0.0/24 is subnetted, 5 subnets C 10.5.5.0 is directly connected, Serial0.1 O 10.7.7.0 [110/65] via 10.5.5.2, 00:04:27, Serial0.1 C 10.9.9.0 is directly connected, Dialer0 C 10.8.8.0 is directly connected, Loopback0 C 10.200.16.0 is directly connected, Ethernet0 S* 0.0.0.0/0 [1/0] via 10.200.16.1

这是在失败期间被记录的同一同一信息：

kevin#**show interface serial 0.1** Serial0.1 is down, line protocol is down Hardware is HD64570 Internet address is 10.5.5.1/24 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY 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 1w6d, output never, output hang never Last clearing of "show interface" counters 4w2d 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 618 packets input, 50700 bytes 616 packets output, 50384 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) DTR is pulsed for 1 seconds on reset Time to interface disconnect: idle 00:01:57 Interface is bound to Di0 (Encapsulation PPP) LCP Open Open: IPCP Last input 00:00:03, output 00:00:02, 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 1280 packets input, 138077 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 9789 input errors, 9789 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 1309 packets output, 138487

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bytes, 0 underruns 0 output errors, 0 collisions, 15 interface resets 0 output buffer failures,
0 output buffers swapped out 351 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 10.200.16.1 to network 0.0.0.0
172.17.0.0/32 is subnetted, 1 subnets S 172.17.247.195 [1/0] via 10.200.16.1 172.19.0.0/32 is
subnetted, 1 subnets C 172.19.0.1 is directly connected, Loopback1 10.0.0.0/8 is variably
subnetted, 5 subnets, 2 masks O 10.7.7.0/24 [110/1786] via 10.9.9.1, 00:01:21, Dialer0 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 10.200.16.0/24 is directly connected, Ethernet0 S*
0.0.0.0/0 [1/0] via 10.200.16.1
```

# 故障排除

本部分提供的信息可用于对配置进行故障排除。

带点到点子接口和此处将开放式最短路径优先（OSPF）用作路由协议的帧中继配置是为该设置特别规定的。然而，显示的故障检修步骤更加通用，并且适用于不同配置，例如帧中继单点对多点、带有高级数据链路控制（HDLC）的主链路、或点对点协议(PPP)封装，无论它们使用哪种路由协议。

要验证备份功能，作为帧中继交换机的Cisco 4500路由器上的一个接口处于关闭状态，以模拟帧中继网络中的问题。因此，这会导致PVC非活动状态通过帧中继网络传导到DTE路由器上，帧中继子接口中断事件。这将激活备份接口。

## 故障排除命令

**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**
- **调试备份**调试备份事件。
- **调试拨号程序**显示关于数据包或事件的调试信息在拨号接口。
- **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。
- **debug ip ospf events** - 显示有关 OSPF 相关事件的信息，例如邻接、泛洪信息、指定的路由器选择和 Shortest Path First (SPF) 计算
- debug frame-relay events -在支持组播信道和使用动态寻址的网络上显示有关帧中继ARP应答的调试信息。

# 相关信息

- **接入拨号技术支持页面**
- **技术支持 - Cisco Systems**