含備份介面的BRI ISDN備份

目錄

簡介

本文檔提供了ISDN備份的配置示例，並提供了此類配置的基本故障排除資訊。

有關最常見的ISDN備份實現資訊以及它們之間的比較，請參閱以下文檔：評估備份介面、浮動靜態路由和撥號器監視DDR備份。

必要條件

需求

本文件沒有特定先決條件。

採用元件

本檔案中的資訊是根據以下軟體和硬體版本。

- 兩台運行Cisco IOS®軟體版本12.2(3)和12.2(5)的Cisco 2500路由器（幀中繼資料終端裝置[DTE]）。
- 一台用作幀中繼交換機的Cisco 4500路由器。

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您在即時網路中工作，請確保在使用任何命令之前瞭解其潛在影響。

慣例

如需文件慣例的詳細資訊，請參閱思科技術提示慣例。

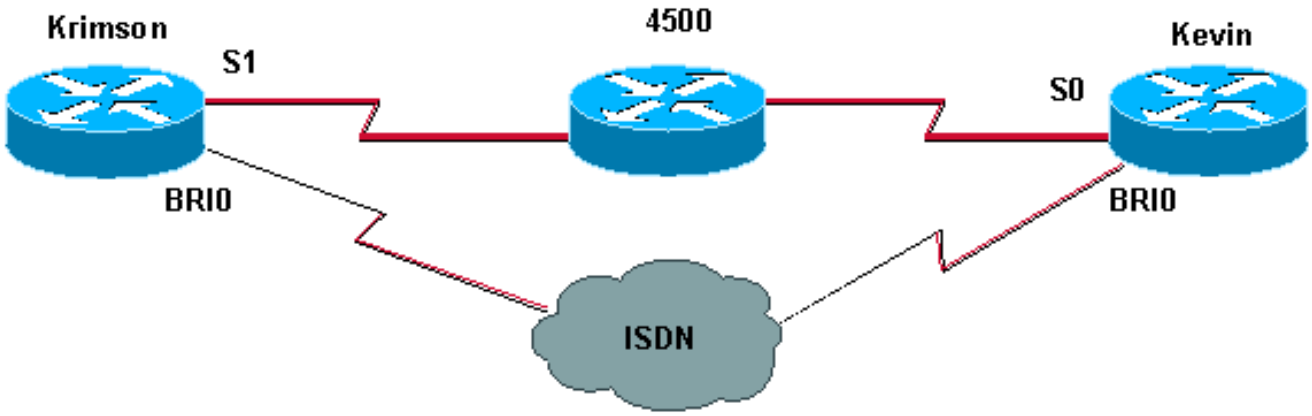
設定

本節提供用於設定本文件中所述功能的資訊。

注意：要查詢有關本文檔中使用的命令的其他資訊，請使用命令查詢工具(僅限註冊客戶)。

網路圖表

本文檔使用下圖所示的網路設定。



組態

本文檔使用如下所示的配置。

krimson（思科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（思科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
```

驗證

本節提供的資訊可用於確認您的組態是否正常運作。

使用以下命令驗證您的配置：

輸出直譯器工具支援某些**show**命令，使用此工具可檢視**show**命令輸出的分析。

- **show interfaces serial** — 顯示有關組播資料鏈路連線識別符號(DLCI)、介面上使用的DLCI以及本地管理介面(LMI)使用的DLCI的資訊。
- **show interface dialer** — 顯示有關撥號器介面的資訊。
- **show ip route** — 顯示IP路由表條目。

```
   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

在這裡，我們可以看到幀中繼介面正在關閉。

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
```

在這裡，我們可以看到一旦幀中繼網路中的故障被清除，系統就會恢復到初始狀態：

```
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：被叫端不需要任何特定配置。

在正常操作過程中記錄的相同show輸出包含以下資訊：

```
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
```

下面是故障期間記錄的相同資訊：

```
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 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
```

疑難排解

本節提供的資訊可用於對組態進行疑難排解。

此處使用的具有點對點子介面和開放最短路徑優先(OSPF)路由協定的幀中繼配置特定於此設定。但是，圖中所示的故障排除步驟更為通用，可用於不同的配置，例如幀中繼點對多點或具有高級資料鏈路控制(HDLC)或點對點協定(PPP)封裝的主鏈路，而不管所使用的路由協定如何。

為了檢驗備份功能，Cisco 4500路由器上用作幀中繼交換機的一個介面已置於關閉狀態，以便模擬幀中繼網路中的問題。因此，這會導致PVC非活動狀態通過幀中繼網路傳給DTE路由器，並引發幀中繼子介面關閉事件。這將啟用備份介面。

疑難排解指令

注意：發出debug指令之前，請先參閱有關Debug指令的重要資訊。

- debug isdn q931
- debug backup -調試備份事件。

- **debug dialer** — 顯示有關撥號器介面上的資料包或事件的調試資訊。
- **debug ppp negotiation** — 使**debug ppp**命令顯示PPP啟動期間傳輸的PPP資料包，其中會協商PPP選項。
- **debug ppp authentication** — 使**debug ppp**命令顯示身份驗證協定消息，包括質詢身份驗證協定(CHAP)資料包交換和口令身份驗證協定(PAP)交換。
- **debug ip ospf events** — 顯示有關OSPF相關事件的資訊，例如鄰接關係、泛洪資訊、指定路由器選擇和最短路徑優先(SPF)計算
- **debug frame-relay events** — 顯示有關支援組播通道並使用動態定址的網路上的幀中繼ARP應答的調試資訊。

相關資訊

- 存取撥號技術支援頁面
- 技術支援 - Cisco Systems