

使用Dialer Watch配置BRI 多链路ISDN备份

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简介

本文档提供了使用 Dialer Watch 配置 BRI 多链路 ISDN 备份的示例配置。

它提供了基本的故障排除命令，以及有关结合使用备份方案中实现的点对点 (PPP) 多链路和 Dialer Watch 进行的配置的故障排除的特定说明。

当主帧中继接口或子接口断开时，可以使用此配置。

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](#)。

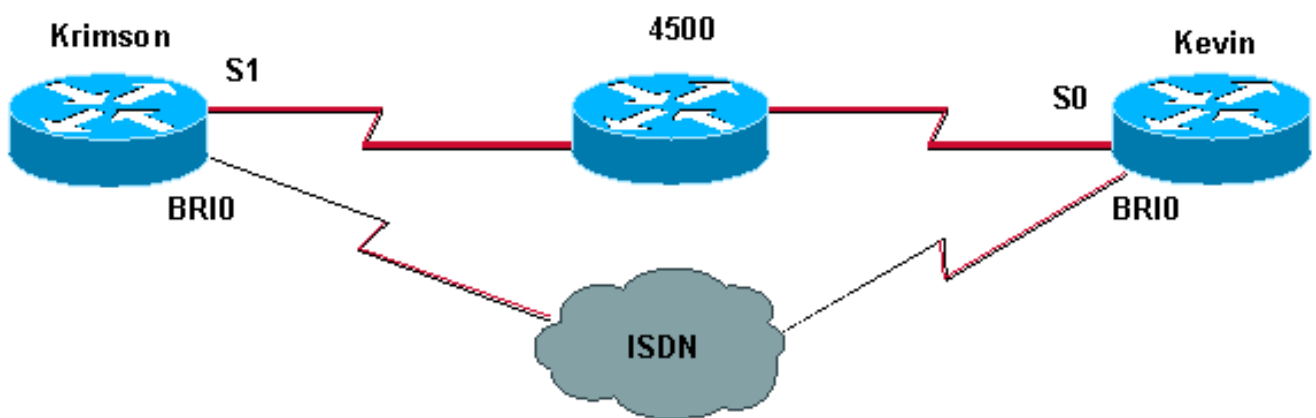
配置

本部分提供有关如何配置本文档所述功能的信息。

注意： 要寻找关于用于本文的指令的其他信息，请使用命令查找工具

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
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  
!  
interface Serial1.1 point-to-point  
ip address 10.5.5.2 255.255.255.0  
no ip route-cache  
frame-relay interface-dlci 20  
!  
interface BRI0  
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 load-threshold 1 either  
dialer watch-group 1  
dialer-group 1  
no cdp enable  
ppp authentication chap  
ppp multilink  
!  
!  
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  
ip route 0.0.0.0 0.0.0.0 10.200.16.1  
no ip http server  
!  
access-list 101 deny ospf any any  
access-list 101 permit ip any any  
dialer watch-list 1 ip 10.8.8.0 255.255.255.0  
dialer-list 1 protocol ip list 101  
!  
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  
ppp multilink  
!  
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
ip route 0.0.0.0 0.0.0.0 10.200.16.1
no ip http server
!
access-list 101 deny ospf any any
access-list 101 permit ip any any
dialer-list 1 protocol ip list 101
!
!
line con 0
exec-timeout 0 0
line aux 0
modem InOut
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。

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 dialer** - 显示有关拨号程序接口的信息。
- **show ip route** - 显示IP 路由表条目。
- **show frame-relay pvc** - 显示路由器上的 PVC 的状态。

show 命令输出示例

以下 **show** 命令显示在帧中继链路运行时呼叫路由器上的初始状态：

```
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
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation FRAME-RELAY

krimson#show frame pvc
PVC Statistics for interface Serial1 (Frame Relay DTE)

Active Inactive Deleted Static
Local 1 0 0 0
Switched 0 0 0 0
Unused 0 0 0 0
```

DLCI = 20, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial1.1

input pkts 53280 output pkts 62150 in bytes 3851528
out bytes 6340750 dropped pkts 0 in FECN pkts 0
in BECN pkts 0 out FECN pkts 0 out BECN pkts 0
in DE pkts 0 out DE pkts 0
out bcast pkts 62092 out bcast bytes 6334184
pvc create time 1w2d, last time pvc status changed 00:02:54

krimson#show interface dialer 0

Dialer0 is up (spoofing), 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
Last input 00:01:50, output never, output hang never
Last clearing of "show interface" counters 8w0d
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 12 kilobits/sec
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
31010 packets input, 2101372 bytes
31036 packets output, 2100401 bytes

krimson#show interface serial 1

Serial1 is up, line protocol is up
Hardware is HD64570
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation FRAME-RELAY, loopback not set
Keepalive set (10 sec)
LMI enq sent 53297, LMI stat recvd 52975, LMI upd recvd 0, DTE LMI up
LMI enq recvd 3, LMI stat sent 0, LMI upd sent 0
LMI DLCI 1023 LMI type is CISCO frame relay DTE
FR SVC disabled, LAPF state down
Broadcast queue 0/64, broadcasts sent/dropped 62118/1, interface broadcasts 53298
Last input 00:00:01, output 00:00:01, output hang never
Last clearing of "show interface" counters 3w1d
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 0/3/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 48 kilobits/sec
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
106412 packets input, 4626191 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
115787 packets output, 7047349 bytes, 0 underruns
0 output errors, 0 collisions, 46425 interface resets
0 output buffer failures, 0 output buffers swapped out
76 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 10.200.16.1 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
C 10.5.5.0 is directly connected, Serial1.1
O 10.8.8.0 [110/1563] via 10.5.5.1, 00:04:35, Serial1.1
C 10.9.9.0 is directly connected, Dialer0
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

以下输出显示帧中继链路将断开，而 ISDN 链路将接通：

```
*Apr 26 04:57:25.801: OSPF: Rcv hello from 172.19.0.1 area 0 from Serial1.1 10.5.5.1
*Apr 26 04:57:25.805: OSPF: End of hello processing

*Apr 26 04:57:36.765: %LINK-3-UPDOWN: Interface Serial1, changed state to down
*Apr 26 04:57:36.773: OSPF: Interface Serial1.1 going Down
*Apr 26 04:57:36.777: %OSPF-5-ADJCHG: Process 10, Nbr 172.19.0.1 on Serial1.1
from FULL to DOWN, Neighbor Down: Interface down or detached
*Apr 26 04:57:36.921: DDR: Dialer Watch: watch-group = 1
*Apr 26 04:57:36.925: DDR: network 10.8.8.0/255.255.255.0 DOWN,
*Apr 26 04:57:36.929: DDR: primary DOWN
*Apr 26 04:57:36.929: DDR: Dialer Watch: Dial Reason: Primary of group 1 DOWN
*Apr 26 04:57:36.933: DDR: Dialer Watch: watch-group = 1,
*Apr 26 04:57:36.933: BR0 DDR: rotor dialout [priority]
*Apr 26 04:57:36.933: DDR: dialing secondary by dialer string 6120 on Di0
*Apr 26 04:57:36.937: BR0 DDR: Attempting to dial 6120
*Apr 26 04:57:36.941: ISDN BR0: Outgoing call id = 0x818B, dsl 0
*Apr 26 04:57:37.033: ISDN BR0: Event: Call to 6120 at 64 Kb/s
*Apr 26 04:57:37.033: ISDN BR0: process_bri_call(): call id 0x818B, called_number
6120, speed 64, call type DATA
*Apr 26 04:57:37.037: CCBRI_Go Fr Host InPkgInfo (Len=20) :
*Apr 26 04:57:37.041: 1 0 1 81 8B 0 4 2 88 90 18 1 83 70 5 80 36 31 32 30
*Apr 26 04:57:37.049:
*Apr 26 04:57:37.049: CC_CHAN_GetIdleChanbri: dsl 0
*Apr 26 04:57:37.053: Found idle channel B1
*Apr 26 04:57:37.065: ISDN BR0: TX -> SETUP pd = 8 callref = 0x0E
*Apr 26 04:57:37.069: Bearer Capability i = 0x8890
*Apr 26 04:57:37.077: Channel ID i = 0x83
*Apr 26 04:57:37.081: Called Party Number i = 0x80, '6120', Plan:Unknown,
Type:Unknown
*Apr 26 04:57:37.161: ISDN BR0: RX <- CALL_PROC pd = 8 callref = 0x8E
*Apr 26 04:57:37.165: Channel ID i = 0x89
*Apr 26 04:57:37.181: CCBRI_Go Fr L3 pkt (Len=7) :
*Apr 26 04:57:37.181: 2 1 E 98 18 1 89
*Apr 26 04:57:37.185:
*Apr 26 04:57:37.189: ISDN BR0: LIF_EVENT: ces/callid 1/0x818B HOST_PROCEEDING
*Apr 26 04:57:37.189: ISDN BR0: HOST_PROCEEDING
*Apr 26 04:57:37.193: ISDN BR0: HOST_MORE_INFO
*Apr 26 04:57:37.461: ISDN BR0: RX <- CONNECT pd = 8 callref = 0x8E
*Apr 26 04:57:37.477: CCBRI_Go Fr L3 pkt (Len=4) :
*Apr 26 04:57:37.481: 7 1 E 91
*Apr 26 04:57:37.481:
```

```
*Apr 26 04:57:37.485: ISDN BR0: LIF_EVENT: ces/callid 1/0x818B HOST_CONNECT
*Apr 26 04:57:37.489: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
*Apr 26 04:57:37.493: BR0:1 DDR: Dialer Watch: resetting call in progress
*Apr 26 04:57:37.497: %DIALER-6-BIND: Interface BR0:1 bound to profile Di0
*Apr 26 04:57:37.509: ISDN: get_isdn_service_state(): idb 0x221DA8
bchan 2 is_isdn 1 Not a Pri
*Apr 26 04:57:37.513: BR0:1 PPP: Treating connection as a callout
*Apr 26 04:57:37.513: BR0:1 PPP: Phase is ESTABLISHING, Active Open
[0 sess, 0 load]
*Apr 26 04:57:37.517: BR0:1 LCP: O CONFREQ [Closed] id 102 len 29
*Apr 26 04:57:37.521: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:37.525: BR0:1 LCP: MagicNumber 0x2180E264 (0x05062180E264)
*Apr 26 04:57:37.529: BR0:1 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:37.529: BR0:1 LCP: EndpointDisc 1 krimson (0x130A016B72696D736F6E)
*Apr 26 04:57:37.533: ISDN BR0: Event: Connected to 6120 on B1 at 64 Kb/s
*Apr 26 04:57:37.541: ISDN BR0: TX -> CONNECT_ACK pd = 8 callref = 0x0E
*Apr 26 04:57:37.581: BR0:1 LCP: I CONFREQ [REQsent] id 191 len 27
*Apr 26 04:57:37.585: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:37.589: BR0:1 LCP: MagicNumber 0xCA476259 (0x0506CA476259)
*Apr 26 04:57:37.593: BR0:1 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:37.593: BR0:1 LCP: EndpointDisc 1 kevin (0x1308016B6576696E)
*Apr 26 04:57:37.601: BR0:1 LCP: O CONFACK [REQsent] id 191 len 27
*Apr 26 04:57:37.605: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:37.605: BR0:1 LCP: MagicNumber 0xCA476259 (0x0506CA476259)
*Apr 26 04:57:37.609: BR0:1 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:37.613: BR0:1 LCP: EndpointDisc 1 kevin (0x1308016B6576696E)
*Apr 26 04:57:37.617: BR0:1 LCP: I CONFACK [ACKsent] id 102 len 29
*Apr 26 04:57:37.621: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:37.621: BR0:1 LCP: MagicNumber 0x2180E264 (0x05062180E264)
*Apr 26 04:57:37.625: BR0:1 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:37.629: BR0:1 LCP: EndpointDisc 1 krimson (0x130A016B72696D736F6E)
*Apr 26 04:57:37.633: BR0:1 LCP: State is Open
*Apr 26 04:57:37.633: BR0:1 PPP: Phase is AUTHENTICATING, by both
[0 sess, 0 load]
*Apr 26 04:57:37.637: BR0:1 CHAP: O CHALLENGE id 157 len 28 from "krimson"
*Apr 26 04:57:37.657: BR0:1 CHAP: I CHALLENGE id 159 len 26 from "kevin"
*Apr 26 04:57:37.661: BR0:1 CHAP: O RESPONSE id 159 len 28 from "krimson"
*Apr 26 04:57:37.709: BR0:1 CHAP: I SUCCESS id 159 len 4
*Apr 26 04:57:37.725: BR0:1 CHAP: I RESPONSE id 157 len 26 from "kevin"
*Apr 26 04:57:37.733: BR0:1 CHAP: O SUCCESS id 157 len 4
*Apr 26 04:57:37.737: BR0:1 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
*Apr 26 04:57:37.745: Di0 PPP: Phase is UP [0 sess, 0 load]
*Apr 26 04:57:37.749: Di0 IPCP: O CONFREQ [Closed] id 103 len 10
*Apr 26 04:57:37.753: Di0 IPCP: Address 10.9.9.1 (0x03060A090901)
*Apr 26 04:57:37.757: Di0 MLP: Added first link BR0:1 to bundle kevin
*Apr 26 04:57:37.757: Di0 PPP: Treating connection as a callout
*Apr 26 04:57:37.765: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
changed state to down
*Apr 26 04:57:37.773: Di0 IPCP: I CONFREQ [REQsent] id 103 len 10
*Apr 26 04:57:37.777: Di0 IPCP: Address 10.9.9.2 (0x03060A090902)
*Apr 26 04:57:37.777: Di0 IPCP: O CONFACK [REQsent] id 103 len 10
*Apr 26 04:57:37.781: Di0 IPCP: Address 10.9.9.2 (0x03060A090902)
*Apr 26 04:57:37.801: Di0 IPCP: I CONFACK [ACKsent] id 103 len 10
*Apr 26 04:57:37.805: Di0 IPCP: Address 10.9.9.1 (0x03060A090901)
*Apr 26 04:57:37.805: Di0 IPCP: State is Open
*Apr 26 04:57:37.813: Di0 DDR: dialer protocol up
*Apr 26 04:57:37.821: Di0 IPCP: Install route to 10.9.9.2
*Apr 26 04:57:38.225: BR0 DDR: rotor dialout [priority]
*Apr 26 04:57:38.225: BR0 DDR: Attempting to dial 6120
*Apr 26 04:57:38.229: ISDN BR0: Outgoing call id = 0x818C, dsl 0
*Apr 26 04:57:38.233: ISDN BR0: Event: Call to 6120 at 64 Kb/s
*Apr 26 04:57:38.233: ISDN BR0: process_bri_call(): call id 0x818C, called_number
6120, speed 64, call type DATA
*Apr 26 04:57:38.237: CCBRI_Go Fr Host InPkgInfo (Len=20) :
```



```
*Apr 26 04:57:38.241: 1 0 1 81 8C 0 4 2 88 90 18 1 83 70 5 80 36 31 32 30
*Apr 26 04:57:38.249:
*Apr 26 04:57:38.249: CC_CHAN_GetIdleChanbri: dsl 0
*Apr 26 04:57:38.253: Found idle channel B2
*Apr 26 04:57:38.265: ISDN BR0: TX -> SETUP pd = 8 callref = 0x0F
*Apr 26 04:57:38.269: Bearer Capability i = 0x8890
*Apr 26 04:57:38.277: Channel ID i = 0x83
*Apr 26 04:57:38.281: Called Party Number i = 0x80, '6120', Plan:Unknown,
Type:Unknown
*Apr 26 04:57:38.377: ISDN BR0: RX <- CALL_PROC pd = 8 callref = 0x8F
*Apr 26 04:57:38.385: Channel ID i = 0x8A
*Apr 26 04:57:38.405: CCBRI_Go Fr L3 pkt (Len=7) :
*Apr 26 04:57:38.405: 2 1 F 98 18 1 8A
*Apr 26 04:57:38.409:
*Apr 26 04:57:38.413: ISDN BR0: LIF_EVENT: ces/callid 1/0x818C HOST_PROCEEDING
*Apr 26 04:57:38.413: ISDN BR0: HOST_PROCEEDING
*Apr 26 04:57:38.417: ISDN BR0: HOST_MORE_INFO
*Apr 26 04:57:38.737: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to up
*Apr 26 04:57:38.761: ISDN BR0: RX <- CONNECT pd = 8 callref = 0x8F
*Apr 26 04:57:38.781: CCBRI_Go Fr L3 pkt (Len=4) :
*Apr 26 04:57:38.781: 7 1 F 91
*Apr 26 04:57:38.785:
*Apr 26 04:57:38.785: ISDN BR0: LIF_EVENT: ces/callid 1/0x818C HOST_CONNECT
*Apr 26 04:57:38.789: %LINK-3-UPDOWN: Interface BRI0:2, changed state to up
*Apr 26 04:57:38.797: %DIALER-6-BIND: Interface BR0:2 bound to profile Di0
*Apr 26 04:57:38.805: %ISDN-6-CONNECT: Interface BRI0:1 is now connected
to 6120 kevin
*Apr 26 04:57:38.809: ISDN: get_isdn_service_state():
idb 0x225754 bchan 3 is_isdn 1 Not a Pri
*Apr 26 04:57:38.813: BR0:2 PPP: Treating connection as a callout
*Apr 26 04:57:38.817: BR0:2 PPP: Phase is ESTABLISHING, Active Open
[0 sess, 0 load]
*Apr 26 04:57:38.821: BR0:2 LCP: O CONFREQ [Closed] id 50 len 29
*Apr 26 04:57:38.825: BR0:2 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:38.825: BR0:2 LCP: MagicNumber 0x2180E77A (0x05062180E77A)
*Apr 26 04:57:38.829: BR0:2 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:38.833: BR0:2 LCP: EndpointDisc 1 krimson (0x130A016B72696D736F6E)
*Apr 26 04:57:38.837: ISDN BR0: Event: Connected to 6120 on B2 at 64 Kb/s
*Apr 26 04:57:38.845: ISDN BR0: TX -> CONNECT_ACK pd = 8 callref = 0x0F
*Apr 26 04:57:38.885: BR0:2 LCP: I CONFREQ [REQsent] id 102 len 27
*Apr 26 04:57:38.889: BR0:2 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:38.893: BR0:2 LCP: MagicNumber 0xCA476774 (0x0506CA476774)
*Apr 26 04:57:38.897: BR0:2 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:38.897: BR0:2 LCP: EndpointDisc 1 kevin (0x1308016B6576696E)
*Apr 26 04:57:38.905: BR0:2 LCP: O CONFACK [REQsent] id 102 len 27
*Apr 26 04:57:38.905: BR0:2 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:38.909: BR0:2 LCP: MagicNumber 0xCA476774 (0x0506CA476774)
*Apr 26 04:57:38.913: BR0:2 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:38.917: BR0:2 LCP: EndpointDisc 1 kevin (0x1308016B6576696E)
*Apr 26 04:57:38.921: BR0:2 LCP: I CONFACK [ACKsent] id 50 len 29
*Apr 26 04:57:38.925: BR0:2 LCP: AuthProto CHAP (0x0305C22305)
*Apr 26 04:57:38.925: BR0:2 LCP: MagicNumber 0x2180E77A (0x05062180E77A)
*Apr 26 04:57:38.929: BR0:2 LCP: MRRU 1524 (0x110405F4)
*Apr 26 04:57:38.933: BR0:2 LCP: EndpointDisc 1 krimson (0x130A016B72696D736F6E)
*Apr 26 04:57:38.937: BR0:2 LCP: State is Open
*Apr 26 04:57:38.937: BR0:2 PPP: Phase is AUTHENTICATING, by both
[0 sess, 0 load]
*Apr 26 04:57:38.941: BR0:2 CHAP: O CHALLENGE id 104 len 28 from "krimson"
*Apr 26 04:57:38.961: BR0:2 CHAP: I CHALLENGE id 102 len 26 from "kevin"
*Apr 26 04:57:38.969: BR0:2 CHAP: O RESPONSE id 102 len 28 from "krimson"
*Apr 26 04:57:39.017: BR0:2 CHAP: I SUCCESS id 102 len 4
*Apr 26 04:57:39.033: BR0:2 CHAP: I RESPONSE id 104 len 26 from "kevin"
*Apr 26 04:57:39.037: BR0:2 CHAP: O SUCCESS id 104 len 4
```

```
*Apr 26 04:57:39.045: BR0:2 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
*Apr 26 04:57:39.049: Di0 MLP: Added link BR0:2 to bundle kevin
*Apr 26 04:57:40.045: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:2,
changed state to up
*Apr 26 04:57:40.749: OSPF: Rcv hello from 172.19.0.1 area 0 from Dialer0 10.9.9.2
*Apr 26 04:57:40.757: OSPF: 2 Way Communication to 172.19.0.1 on Dialer0, state 2WAY
*Apr 26 04:57:40.757: OSPF: Send DBD to 172.19.0.1 on Dialer0 seq 0x67F opt
0x42 flag 0x7 len 32
*Apr 26 04:57:40.765: OSPF: End of hello processing
*Apr 26 04:57:40.801: OSPF: Rcv DBD from 172.19.0.1 on Dialer0 seq 0x2175 opt
0x42 flag 0x7 len 32 mtu 1500 state EXSTART
*Apr 26 04:57:40.805: OSPF: NBR Negotiation Done. We are the SLAVE
*Apr 26 04:57:40.805: OSPF: Send DBD to 172.19.0.1 on Dialer0 seq 0x2175 opt
0x42 flag 0x2 len 72
*Apr 26 04:57:40.853: OSPF: Rcv DBD from 172.19.0.1 on Dialer0 seq 0x2176 opt
0x42 flag 0x3 len 72 mtu 1500 state EXCHANGE
*Apr 26 04:57:40.857: OSPF: Send DBD to 172.19.0.1 on Dialer0 seq 0x2176 opt
0x42 flag 0x0 len 32
*Apr 26 04:57:40.865: OSPF: Database request to 172.19.0.1
*Apr 26 04:57:40.865: OSPF: sent LS REQ packet to 10.9.9.2, length 12
*Apr 26 04:57:40.905: OSPF: Rcv DBD from 172.19.0.1 on Dialer0 seq 0x2177 opt
0x42 flag 0x1 len 32 mtu 1500 state EXCHANGE
*Apr 26 04:57:40.909: OSPF: Exchange Done with 172.19.0.1 on Dialer0
*Apr 26 04:57:40.909: OSPF: Send DBD to 172.19.0.1 on Dialer0 seq 0x2177 opt
0x42 flag 0x0 len 32
*Apr 26 04:57:40.921: OSPF: Synchronized with 172.19.0.1 on Dialer0, state FULL
*Apr 26 04:57:40.925: %OSPF-5-ADJCHG: Process 10, Nbr 172.19.0.1 on Dialer0
from LOADING to FULL, Loading Done
*Apr 26 04:57:44.917: %ISDN-6-CONNECT: Interface BRI0:2 is now connected to
6120 kevin
*Apr 26 04:58:00.753: OSPF: Rcv hello from 172.19.0.1 area 0 from Dialer0 10.9.9.2
*Apr 26 04:58:00.753: OSPF: End of hello processing
*Apr 26 04:57:50.753: OSPF: Rcv hello from 172.19.0.1 area 0 from Dialer0 10.9.9.2
*Apr 26 04:57:50.753: OSPF: End of hello processing
```

```
krimson#show interface serial 1
```

```
Serial1 is down, line protocol is down
```

```
!-- note that the physical Frame Relay interface is down. due to shutdown on locally
attacher port on FR switch Hardware is HD64570 MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255 Encapsulation FRAME-RELAY, loopback not set
Keepalive set (10 sec) LMI enq sent 53316, LMI stat recvd 52994, LMI upd recvd 0, DTE LMI down
LMI enq recvd 3, LMI stat sent 0, LMI upd sent 0 LMI DLCI 1023 LMI type is CISCO frame relay DTE
FR SVC disabled, LAPF state down Broadcast queue 0/64, broadcasts sent/dropped 62140/1,
interface broadcasts 53317 Last input 00:00:57, output 00:00:57, output hang never Last clearing
of "show interface" counters 3wld 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 0/3/16 (active/max active/max total) Reserved Conversations
0/0 (allocated/max allocated) Available Bandwidth 48 kilobits/sec 5 minute input rate 0
bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0 packets/sec 106450 packets input,
4627830 bytes, 0 no buffer --More-- Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0
input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 115828 packets output, 7049810
bytes, 0 underruns 0 output errors, 0 collisions, 46426 interface resets 0 output buffer
failures, 0 output buffers swapped out 77 carrier transitions DCD=down DSR=down DTR=up RTS=up
CTS=down krimson#show interface serial 1.1
```

```
Serial1.1 is down, line protocol is down
```

```
Hardware is HD64570
```

```
Internet address is 10.5.5.2/24
```

```
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
```

```
Dialer0 is up, line protocol is up
```

```
Hardware is Unknown
```

```
Internet address is 10.9.9.1/24
MTU 1500 bytes, BW 128 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
Time to interface disconnect: idle 00:00:57
Interface is bound to BR0:1
Interface is bound to BR0:2
LCP Open, multilink Open
Open: IPCP
Last input 00:00:09, output never, output hang never
Last clearing of "show interface" counters 8w0d
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 66 kilobits/sec
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
31025 packets input, 2102400 bytes
31053 packets output, 2101523 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
Interface is bound to Di0 (Encapsulation PPP)
LCP Open, multilink Open
Last input 00:00:11, 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
34919 packets input, 2419929 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
34744 packets output, 2252062 bytes, 0 underruns
0 output errors, 0 collisions, 27 interface resets
0 output buffer failures, 0 output buffers swapped out
925 carrier transitions
Bound to:
BRI0:2 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
Interface is bound to Di0 (Encapsulation PPP)
LCP Open, multilink Open
Last input 00:00:03, output 00:00:07, 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
2165 packets input, 87326 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
```

```
2260 packets output, 89305 bytes, 0 underruns
0 output errors, 0 collisions, 27 interface resets
0 output buffer failures, 0 output buffers swapped out
345 carrier transitions
```

```
krimson#show frame pvc
```

```
PVC Statistics for interface Serial1 (Frame Relay DTE)
```

```
Active Inactive Deleted Static
```

```
Local 0 0 1 0
Switched 0 0 0 0
Unused 0 0 0 0
```

```
DLCI = 20, DLCI USAGE = LOCAL, PVC STATUS = DELETED, INTERFACE = Serial1.1
```

```
input pkts 53307 output pkts 62181 in bytes 3853472
out bytes 6343822 dropped pkts 0 in FECN pkts 0
in BECN pkts 0 out FECN pkts 0 out BECN pkts 0
in DE pkts 0 out DE pkts 0
out bcast pkts 62123 out bcast bytes 6337256
pvc create time 1w2d, last time pvc status changed 00:01:12
```

```
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 [110/782] via 10.9.9.2, 00:01:03, Dialer0
!--- now route to the destination network points to 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
```

帧中继接口将接通，而备份接口将断开。

```
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
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation FRAME-RELAY
```

```
*Apr 26 04:59:49.481: %LINK-3-UPDOWN: Interface Serial1, changed state to up
*Apr 26 04:59:50.481: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1,
changed state to up
*Apr 26 05:01:44.001: Di0 DDR: idle timeout
```

```
!--- backup is going down after expiration of the idle timer *Apr 26 05:01:44.001: DDR:
Dialer Watch: watch-group = 1 *Apr 26 05:01:44.001: DDR: network 10.8.8.0/255.255.255.0 UP, *Apr
26 05:01:44.005: DDR: primary DOWN *Apr 26 05:01:44.009: Di0 DDR: disconnecting call *Apr 26
05:01:44.013: BR0:1 PPP: Phase is TERMINATING [0 sess, 1 load] *Apr 26 05:01:44.013: BR0:1 LCP:
O TERMREQ [Open] id 106 len 4 *Apr 26 05:01:44.021: BR0:2 PPP: Phase is TERMINATING [0 sess, 1
```

load] *Apr 26 05:01:44.021: BR0:2 LCP: O TERMREQ [Open] id 54 len 4 *Apr 26 05:01:44.029: Di0
IPCP: State is Closed *Apr 26 05:01:44.033: Di0 PPP: Phase is TERMINATING [0 sess, 1 load] *Apr
26 05:01:44.033: Di0 LCP: State is Closed *Apr 26 05:01:44.037: Di0 PPP: Phase is DOWN [0 sess,
1 load] *Apr 26 05:01:44.041: Di0 IPCP: Remove route to 10.9.9.2 *Apr 26 05:01:44.045: BR0:1
LCP: I TERMACK [TERMsent] id 106 len 4 *Apr 26 05:01:44.049: BR0:1 LCP: State is Closed *Apr 26
05:01:44.049: BR0:1 PPP: Phase is DOWN [0 sess, 1 loow ad] *Apr 26 05:01:44.053: BR0 DDR: has
total 1 call(s), dial_out 1, dial_in 0 *Apr 26 05:01:44.057: BR0:1 PPP: Treating connection as a
callout *Apr 26 05:01:44.057: BR0:1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
*Apr 26 05:01:44.061: BR0:1 LCP: O CONFREQ [Closed] id 107 len 15 *Apr 26 05:01:44.065: BR0:1
LCP: AuthProto CHAP (0x0305C22305) *Apr 26 05:01:44.069: BR0:1 LCP: MagicNumber 0x2184A57C
(0x05062184A57C) *Apr 26 05:01:44.069: %DIALER-6-UNBIND: Interface BR0:1 unbound from profile
Di0 *Apr 26 05:01:44.077: BR0:1 DDR: disconnecting call *Apr 26 05:01:44.077: BR0:1 DDR: Dialer
Watch: resetting call in progress *Apr 26 05:01:44.081: DDR: Dialer Watch: watch-group = 1 *Apr
26 05:01:44.081: DDR: network 10.8.8.0/255.255.255.0 UP, *Apr 26 05:01:44.085: DDR: primary DOWN
*Apr 26 05:01:44.085: ISDN BR0: Event: Hangup call to call id 0x818D *Apr 26 05:01:44.089: ISDN
BR0: process_disconnect(): call id 0x818D, call type is DATA, b_idb 0x221DA8, ces 1, cause
Normal call clearing(0x10) *Apr 26 05:01:44.097: %ISDN-6-DISCONNECT: Interface BRI0:1
disconnected from 6120 kevin, call lasted 120 seconds *Apr 26 05:01:44.101: ISDN:
get_isdn_service_state(): idb 0x221DA8 bchan 2 is_isdn 1 Not a Pri *Apr 26 05:01:44.105:
CCBRI_Go Fr Host InPkgInfo (Len=13) : *Apr 26 05:01:44.105: 5 0 1 81 8D 3 8 1 90 8 2 80 90 *Apr
26 05:01:44.109: *Apr 26 05:01:44.121: ISDN BR0: TX -> DISCONNECT pd = 8 callref = 0x10 *Apr 26
05:01:44.129: Cause i = 0x8090 - Normal call clearing *Apr 26 05:01:44.137: BR0:2 LCP: I TERMACK
[TERMsent] id 54 len 4 *Apr 26 05:01:44.141: BR0:2 LCP: State is Closed *Apr 26 05:01:44.141:
BR0:2 PPP: Phase is DOWN [0 sess, 1 load] *Apr 26 05:01:44.145: BR0 DDR: has total 0 call(s),
dial_out 0, dial_in 0 *Apr 26 05:01:44.149: BR0:2 PPP: Treating connection as a callout *Apr 26
05:01:44.149: BR0:2 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load] *Apr 26
05:01:44.153: BR0:2 LCP: O CONFREQ [Closed] id 55 len 15 *Apr 26 05:01:44.157: BR0:2 LCP:
AuthProto CHAP (0x0305C22305) *Apr 26 05:01:44.161: BR0:2 LCP: MagicNumber 0x2184A5D9
(0x05062184A5D9) *Apr 26 05:01:44.161: %DIALER-6-UNBIND: Interface BR0:2 unbound from profile
Di0 *Apr 26 05:01:44.165: BR0:2 DDR: disconnecting call *Apr 26 05:01:44.173: ISDN BR0: Event:
Hangup call to call id 0x818E *Apr 26 05:01:44.173: ISDN BR0: process_disconnect(): call id
0x818E, call type is DATA, b_idb 0x225754, ces 1, cause Normal call clearing(0x10) *Apr 26
05:01:44.181: %ISDN-6-DISCONNECT: Interface BRI0:2 disconnected from 6120 kevin, call lasted 119
seconds *Apr 26 05:01:44.189: ISDN: get_isdn_service_state(): idb 0x225754 bchan 3 is_isdn 1 Not
a Pri *Apr 26 05:01:44.189: CCBRI_Go Fr Host InPkgInfo (Len=13) : *Apr 26 05:01:44.193: 5 0 1 81
8E 3 8 1 90 8 2 80 90 *Apr 26 05:01:44.197: *Apr 26 05:01:44.205: ISDN BR0: RX <- RELEASE pd = 8
callref = 0x90 *Apr 26 05:01:44.221: ISDN BR0: TX -> DISCONNECT pd = 8 callref = 0x11 *Apr 26
05:01:44.225: Cause i = 0x8090 - Normal call clearing *Apr 26 05:01:44.241: CCBRI_Go Fr L3 pkt
(Len=4) : *Apr 26 05:01:44.241: 4D 1 10 97 *Apr 26 05:01:44.245: *Apr 26 05:01:44.249: ISDN BR0:
LIF_EVENT: ces/callid 1/0x818D HOST_DISCONNECT_ACK *Apr 26 05:01:44.253: ISDN:
get_isdn_service_state(): idb 0x221DA8 bchan 2 is_isdn 1 Not a Pri *Apr 26 05:01:44.257: ISDN
BR0: HOST_DISCONNECT_ACK: call type is DATA *Apr 26 05:01:44.257: %LINK-3-UPDOWN: Interface
BRI0:1, changed state to down *Apr 26 05:01:44.265: BR0:1 LCP: State is Closed *Apr 26
05:01:44.265: BR0:1 PPP: Phase is DOWN [0 sess, 0 load] *Apr 26 05:01:44.269: BR0:1 DDR:
disconnecting call *Apr 26 05:01:44.273: ISDN BR0: LIF_EVENT: ces/callid 1/0x818D
HOST_DISCONNECT_ACK *Apr 26 05:01:44.277: ISDN: get_isdn_service_state(): idb 0x221DA8 bchan 2
is_isdn 1 Not a Pri *Apr 26 05:01:44.277: ISDN BR0: HOST_DISCONNECT_ACK: call type is DATA *Apr
26 05:01:44.289: ISDN BR0: TX -> RELEASE_COMP pd = 8 callref = 0x10 *Apr 26 05:01:44.305: ISDN
BR0: RX <- RELEASE pd = 8 callref = 0x91 *Apr 26 05:01:44.325: CCBRI_Go Fr L3 pkt (Len=4) : *Apr
26 05:01:44.325: 4D 1 11 97 *Apr 26 05:01:44.329: *Apr 26 05:01:44.333: ISDN BR0: LIF_EVENT:
ces/callid 1/0x818E HOST_DISCONNECT_ACK *Apr 26 05:01:44.337: ISDN: get_isdn_service_state():
idb 0x225754 bchan 3 is_isdn 1 Not a Pri *Apr 26 05:01:44.341: ISDN BR0: HOST_DISCONNECT_ACK:
call type is DATA *Apr 26 05:01:44.341: %LINK-3-UPDOWN: Interface BRI0:2, changed state to down
*Apr 26 05:01:44.345: BR0:2 LCP: State is Closed *Apr 26 05:01:44.349: BR0:2 PPP: Phase is DOWN
[0 sess, 0 load] *Apr 26 05:01:44.349: BR0:2 DDR: disconnecting call *Apr 26 05:01:44.353: ISDN
BR0: LIF_EVENT: ces/callid 1/0x818E HOST_DISCONNECT_ACK *Apr 26 05:01:44.357: ISDN:
get_isdn_service_state(): idb 0x225754 bchan 3 is_isdn 1 Not a Pri *Apr 26 05:01:44.361: ISDN
BR0: HOST_DISCONNECT_ACK: call type is DATA *Apr 26 05:01:44.369: ISDN BR0: TX -> RELEASE_COMP
pd = 8 callref = 0x11 *Apr 26 05:01:45.009: %LINEPROTO-5-UPDOWN: Line protocol on Interface
BRI0:1, changed state to down *Apr 26 05:01:45.017: %LINEPROTO-5-UPDOWN: Line protocol on
Interface BRI0:2, changed state to down **krimson#show isdn active**

ISDN ACTIVE CALLS

```
Call Calling Called Remote Seconds Seconds Seconds Charges
Type Number Number Name Used Left Idle Units/Currency
```

```
-----
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
```

```
C 10.5.5.0 is directly connected, Serial1.1
```

```
O 10.8.8.0 [110/1563] via 10.5.5.1, 00:00:11, Serial1.1
```

```
!--- The monitored router again shows the primary interface as the next hop C 10.9.9.0 is
directly connected, Dialer0 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
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

此处显示的帧中继配置（具有点对点接口并使用 Open Shortest Path First (OSPF) 作为路由协议）特定于此设置。不过，下面提供的故障排除步骤更常用，可用于不同的配置，例如具有高级数据链路控制 (HDLC) 和 PPP 封装的帧中继单点对多点或主链路，而不管使用什么路由协议。

为验证备份功能，我们将作为帧中继交换机的 Cisco 4500 路由器上的一个接口置于关闭状态，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

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。

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。
- **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。
- **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

- [拨号技术支持页](#)
- [技术支持 - Cisco Systems](#)