

# BRI back-up van ISDN met back-up-interface

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## [Inleiding](#)

Dit document biedt een voorbeeldconfiguratie voor de back-up van ISDN en biedt basisinformatie over het oplossen van problemen voor dit type configuratie.

Raadpleeg voor informatie over de meest gebruikelijke implementaties van ISDN-back-up en vergelijkingen tussen deze onderdelen het volgende document: [Evaluëren van back-upinterfaces, zwevende statische routen en Dialer Watch voor DDR-back-up.](#)

## [Voorwaarden](#)

### [Vereisten](#)

Er zijn geen specifieke voorwaarden van toepassing op dit document.

### [Gebruikte componenten](#)

De informatie in dit document is gebaseerd op de onderstaande software- en hardwareversies.

- Twee Cisco 2500 routers (Frame Relay data-eindapparatuur [DTEs]) die Cisco IOS®-software-releases 12.2(3) en 12.2(5) uitvoeren.
- Eén Cisco 4500-router die fungeert als een Frame Relay-switch.

De informatie in dit document is gebaseerd op apparaten in een specifieke laboratoriumomgeving. Alle apparaten die in dit document worden beschreven, hadden een opgeschoonde (standaard)configuratie. Als u in een levend netwerk werkt, zorg er dan voor dat u de potentiële impact van om het even welke opdracht begrijpt alvorens het te gebruiken.

## Conventies

Zie de [Cisco Technical Tips Convention](#) voor meer informatie over documentconventies.

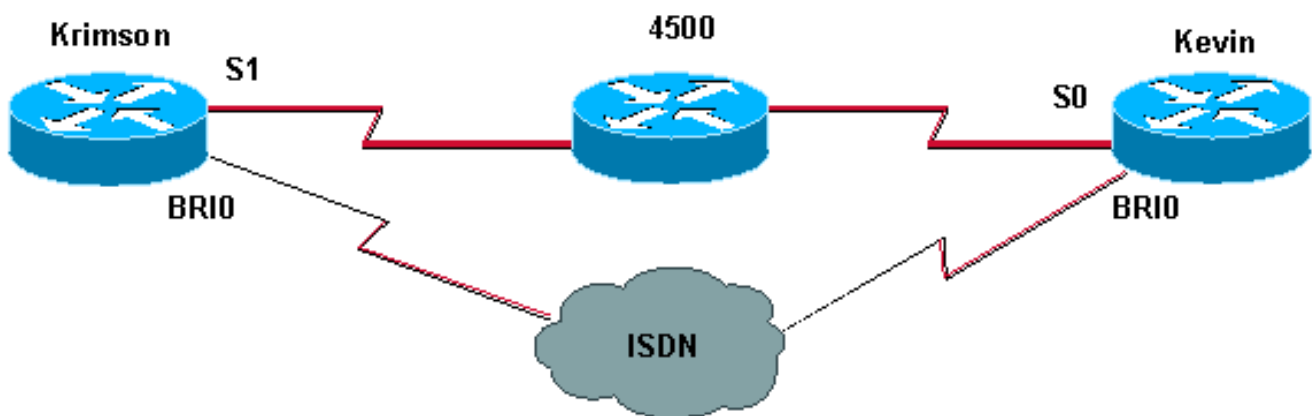
## Configureren

Deze sectie bevat informatie over het configureren van de functies die in dit document worden beschreven.

**N.B.:** Als u aanvullende informatie wilt vinden over de opdrachten in dit document, gebruikt u het [Opdrachtplanningprogramma](#) (alleen [geregistreerd](#) klanten).

## Netwerkdigram

Dit document gebruikt de netwerkinstellingen die in het onderstaande schema zijn weergegeven.



## Configuraties

Dit document maakt gebruik van de onderstaande configuraties.

### krimson (Cisco 2500 router)

```
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 router)

```
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

```

## Verifiëren

Deze sectie verschaft informatie die u kunt gebruiken om te bevestigen dat uw configuratie correct werkt.

Gebruik de volgende opdrachten om de configuratie te controleren:

Bepaalde opdrachten worden ondersteund door het [gereedschap](#) [Tolk-uitgang](#), waarmee u een analyse van de opdrachtoutput kunt bekijken.

- **tonen interfaces seriële** - Hiermee geeft u informatie weer over de multicast data-link Connection identifier (DLCI), de DLCI's die op de interface worden gebruikt en de DLCI's die voor de Local Management Interface (LMI) worden gebruikt.
- **interfacetaler tonen** - Hiermee geeft u informatie over de dialerinterface weer.
- **Toon ip route-** Hiermee geeft u IP-routingsangen weer.

```
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

**Hier kunnen we zien dat de Frame Relay-interface naar beneden gaat.**

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

Hier kunnen we zien dat het systeem terugkeert naar de oorspronkelijke status nadat de fout in het Frame Relay-netwerk is gewist:

```
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 lw6d, 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#
```

**Opmerking:** Er is geen specifieke configuratie nodig op de aangeroepen zijde.

De zelfde show output die tijdens normaal gebruik wordt geregistreerd bevat de volgende informatie:

```
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

```

Hier vindt u dezelfde informatie die tijdens de fout is geregistreerd:

```

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
```

## [Problemen oplossen](#)

Deze sectie bevat informatie waarmee u problemen met de configuratie kunt oplossen.

De configuraties van Frame Relay met point-to-point subinterfaces en Open Snelste pad (OSPF) als een routingsprotocol dat hier wordt gebruikt, zijn specifiek voor deze installatie. De stappen voor het oplossen van problemen die worden getoond zijn echter algemener en kunnen worden gebruikt met verschillende configuraties zoals Frame Relay point-to-multipoint of een primaire verbinding met HDLC (High-Level Data Link Control) of Point to Point Protocol (PPP)-insluiting,

ongeacht het routeringsprotocol dat wordt gebruikt.

Om de reservefunctionaliteit te verifiëren, is een van de interfaces op de Cisco 4500 router die als een switch van Frame Relay dienst doet in shutdown staat geplaatst om probleem binnen het netwerk van Frame Relay te simuleren. Dientengevolge, leidt dit tot de inactieve staat van PVC aan de router DTE via het netwerk van Frame Relay, en een subinterface van Frame Relay. Hiermee wordt de back-upinterface geactiveerd.

## [Opdrachten voor troubleshooting](#)

**Opmerking:** Voordat u **debug**-opdrachten afgeeft, raadpleegt u [Belangrijke informatie over debug-opdrachten](#).

- **debug van ISDN Q931**
- **debug back-up gebeurtenissen:** Debugs back-up gebeurtenissen.
- **debug dialer** - Hiermee geeft u informatie over de pakketten of gebeurtenissen op een dialerinterface weer.
- **debug ppp onderhandeling** - veroorzaakt het **debug ppp** bevel om PPP pakketten die tijdens PPP opstarten worden verzonden te tonen, waar PPP opties worden besproken.
- **debug van PPP-verificatie** - veroorzaakt de **debug ppp**-opdracht om verificatieprotocolberichten weer te geven, inclusief Challenge Verificatie Protocol (CHAP)-pakketuitwisselingen en Wachtwoord Verificatieprotocol (PAP)-uitwisselingen.
- **ip ospf-gebeurtenissen debug** - informatie over OSPF-gerelateerde gebeurtenissen, zoals nabijheid, overstroominformatie, aangewezen routerselectie en kortste pad voor eerste berekening (SPF)
- **debug frame-relais gebeurtenissen** - schitterende informatie over Frame Relay ARP-antwoorden op netwerken die een multicast kanaal ondersteunen en dynamische adressering gebruiken.

## [Gerelateerde informatie](#)

- [Ondersteuningspagina's voor access point](#)
- [Technische ondersteuning - Cisco-systemen](#)