Backup-Bridging über ISDN

Inhalt

Einführung

In diesem Dokument wird erläutert, wie Sie Backup Bridging mit ISDN konfigurieren. Diese Konfiguration verwendet die Methode der Sicherungsschnittstelle, um zu erkennen, dass die primäre Verbindung ausgefallen ist. Weitere Informationen zu Backups finden Sie unter [Konfigurieren und Beheben von DDR-Backups](#).

In überbrückten WAN-Umgebungen ist die einzige verfügbare DDR-Backup-Lösung (Dial-on-Demand Routing) die Verwendung von ISDN, da Bridging over Async nicht unterstützt wird.

Beachten Sie, dass das Bridging auf einer ISDN-Verbindung dazu tendiert, die Verbindung für sehr lange, wenn nicht gar für lange Zeit aktiv zu halten. Wenn die Telefongesellschaft ISDN basierend auf der Verbindungszeit berechnet und die nachverfolgte serielle Verbindung für sehr lange Zeit ausfällt, kann dies zu einer sehr großen Rechnung führen.

Hinweis: Diese Konfiguration gilt für einen Standort und einen B-Kanal. Für mehr als einen B-Kanal müssen Sie Dialer-Profile verwenden. (Weitere Informationen finden Sie unter [Konfigurieren der Dialer-Profile für die Bridge mithilfe der ISDN-](#)Konfiguration.)

Informationen zur Bridging-Konfiguration in einer Nicht-Backup-Umgebung finden Sie unter

[Bridging Across ISDN](#).

Voraussetzungen

Anforderungen

Bevor Sie diese Konfiguration versuchen, stellen Sie sicher, dass Sie die folgenden Anforderungen erfüllen:

- Grundkenntnisse über ISDN

Verwendete Komponenten

Die Informationen in diesem Dokument basieren auf den folgenden Software- und Hardwareversionen:

- Cisco Router der Serie 2500 mit einer seriellen WAN-Schnittstelle und einer BRI-Schnittstelle.
- Cisco IOS® Softwareversion 12.2(7b).

Hinweis: Diese Konfiguration kann mit jedem Router verwendet werden, der über eine (serielle) WAN-Verbindung und einen BRI-Port verfügt.

Die Informationen in diesem Dokument wurden von den Geräten in einer bestimmten Laborumgebung erstellt. Alle in diesem Dokument verwendeten Geräte haben mit einer leeren (Standard-)Konfiguration begonnen. Wenn Ihr Netzwerk in Betrieb ist, stellen Sie sicher, dass Sie die potenziellen Auswirkungen eines Befehls verstehen.

Zugehörige Produkte

Diese Konfiguration kann mit zwei beliebigen Routern verwendet werden, auf denen die Cisco IOS Software ausgeführt wird und die jeweils über mindestens eine serielle WAN-Schnittstelle und eine BRI-Schnittstelle verfügen.

Konventionen

Weitere Informationen zu Dokumentkonventionen finden Sie unter [Cisco Technical Tips Conventions](#).
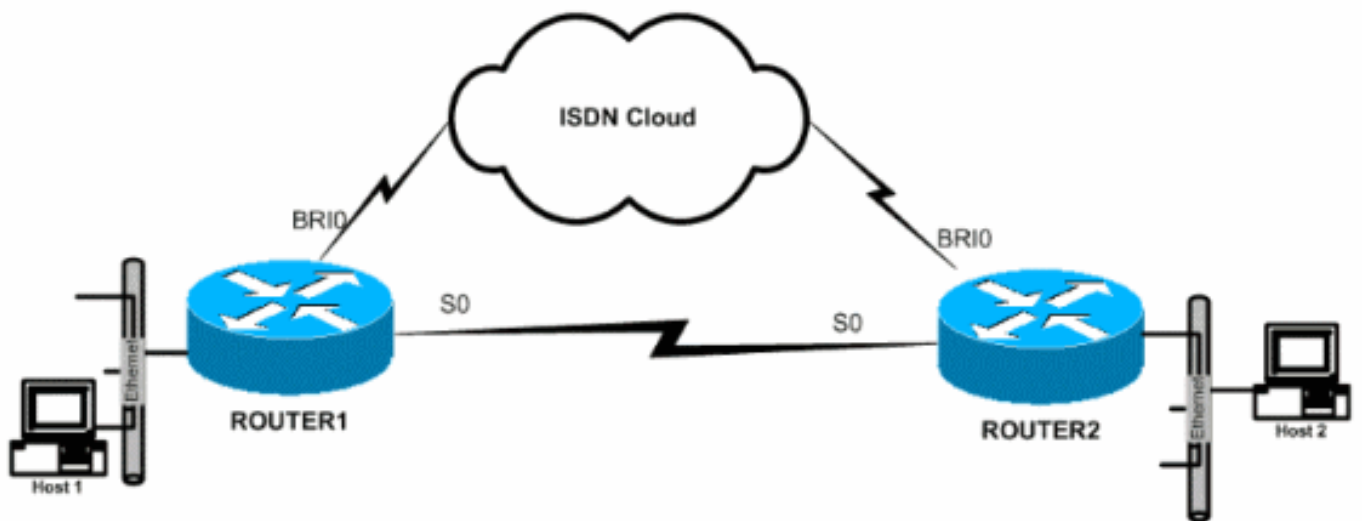
Konfigurieren

In diesem Abschnitt erhalten Sie Informationen zum Konfigurieren der in diesem Dokument beschriebenen Funktionen.

Hinweis: Um weitere Informationen zu den in diesem Dokument verwendeten Befehlen zu erhalten, verwenden Sie das [Command Lookup Tool](#) ([nur registrierte](#) Kunden).

Netzwerkdiagramm

In diesem Dokument wird die folgende Netzwerkeinrichtung verwendet:

Konfigurationen

In diesem Dokument werden folgende Konfigurationen verwendet:

- Router1
- Router2

Router1

<pre>!
hostname ROUTER1
!
!
username ROUTER2 password 0 same
!--- This is required for PPP Challenge Handshake
Authentication Protocol !--- (CHAP) authentication
during dial backup. ! ! isdn switch-type basic-5ess *!---*
The ISDN switch type for this circuit. !--- Obtain this
information from the Telco. !--- This ISDN switch type
is specific to the United States, !--- and could change
based on the requirements of the country and Telco. !
interface Ethernet0 ip address 172.16.55.33
255.255.255.240 no ip directed-broadcast no ip mroute-
cache bridge-group 1 *!--- Assign this interface to*
bridge-group 1. !--- Frames are bridged only among
interfaces in the same group. !--- Note that the BRI
interface and serial interface are also !--- in this
bridge-group 1. ! interface Serial0 description Serial
link to ROUTER2 backup interface BRI0 *!--- This defines*
the backup interface. !--- Cisco IOS Software tracks the
Serial0 interface, and !--- uses BRI0 if Serial0 fails.
ip address 172.16.54.1 255.255.255.0 no ip directed-
broadcast no ip mroute-cache no fair-queue bridge-group
1 *!--- Enable bridging on Serial0 for normal operation.*
! interface BRI0 description ISDN to ROUTER2 ip address
172.16.53.19 255.255.255.240 no ip directed-broadcast
encapsulation ppp no ip mroute-cache dialer map bridge
name ROUTER2 broadcast 5552000 *!--- The* **broadcast**
keyword is required to initiate the ISDN call. !---
Dialer map bridge to the remote router. The statement
includes !--- the name of the remote router and the</pre>

```
phone number to be dialed. !--- Note that this dialer
map statement includes the keyword bridge, !--- and does
not include the IP address of the peer, as required for
!--- IP routing-based dialer maps.
 dialer-group 1
!--- Defines the interesting traffic as configured in
the dialer-list. isdn switch-type basic-5ess !--- Check
with your Telco for the correct values. ppp
authentication chap bridge-group 1 !--- Enable bridging
on BRI0. ! dialer-list 1 protocol bridge permit !---
Defines the interesting traffic. In this case, all
bridged traffic. bridge 1 protocol ieee !--- Defines the
type of Spanning Tree Protocol (STP) used for the !---
interface in bridge-group 1. Here, the IEEE STP is used.
!--- The IEEE 802.1D STP is the preferred way to run the
bridge. !
```

Router2

```
hostname router2
!
!
username ROUTER1 password 0 same
!--- Required for PPP CHAP Authentication during dial
backup. ! isdn switch-type basic-5ess !--- Check with
your Telco at the Router2 side for the correct values. !
interface Ethernet0 ip address 172.16.55.2
255.255.255.240 bridge-group 1 !--- Enable bridging on
Ethernet0. ! interface Serial0 description Serial link
to ROUTER1 !--- The backup interface bri0 command is not
required on this side, !--- because it is sufficient if
one side tracks the serial interface.
 ip address 172.16.54.2 255.255.255.0
 no fair-queue
 bridge-group 1
!--- Enable bridging on Serial0 for normal operation.
interface BRI0 description ISDN to ROUTER1 ip address
172.16.53.17 255.255.255.240 encapsulation ppp no ip
mroute-cache dialer map bridge name ROUTER1 broadcast
5551000 !--- The broadcast keyword is required to
initiate the ISDN call.

 dialer-group 1
!--- Defines the interesting traffic as configured in
the dialer-list. isdn switch-type basic-5ess !--- Check
with your Telco at the Router2 side for the correct
values. ppp authentication chap bridge-group 1 !---
Enable bridging on BRI0. ! dialer-list 1 protocol bridge
permit !--- Defines the interesting traffic. In this
case, all bridged traffic. bridge 1 protocol ieee !---
Defines the type of STP used for the interface in !---
bridge-group 1. Here the IEEE STP is used. !--- The IEEE
802.1D STP is the preferred way to run the bridge. !
```

Überprüfen

Dieser Abschnitt enthält Informationen zur Bestätigung, dass Ihre Konfiguration ordnungsgemäß funktioniert.

Bestimmte show-Befehle werden vom Output Interpreter Tool unterstützt (nur registrierte Kunden), mit dem Sie eine Analyse der show-Befehlsausgabe anzeigen können.

- **show isdn status** - zeigt den Layer-1- (L1), Layer-2- (L2) und Layer-3-Status (L3) der ISDN-Schnittstellen an.
- **show dialer**: Zeigt den Status des Dialers und den individuellen Status der ISDN-Kanäle an.
- **show bridge**: Zeigt Klassen von Einträgen in der Bridge-Weiterleitungsdatenbank an.
- **show interface** - Zeigt den Status der verschiedenen Schnittstellen an, z. B. der seriellen und BRI-Schnittstellen.
- **show spanning-tree**: Zeigt die dem Router bekannte Spanning-Tree-Topologie an.

Befehle auf ROUTER1 anzeigen, wenn Serial0 aktiv ist

```
ROUTER1# show isdn status
   Global ISDN Switchtype = basic-5ess
   ISDN BRI0 interface
   dsl 0, interface ISDN Switchtype = basic-5ess
   Layer 1 Status:
   DEACTIVATED
   Layer 2 Status:
   Layer 2 NOT Activated
   Layer 3 Status:
   0 Active Layer 3 Call(s)
   Activated dsl 0 CCBs = 0
   The Free Channel Mask: 0x80000003
   Number of L2 Discards = 36, L2D_Task Discards = 35
   Total Allocated ISDN CCBs = 0

ROUTER1# show dialer

BRI0 - dialer type = ISDN

Dial String Successes Failures Last DNIS Last status
   5552000 29 977 00:45:08 successful
   0 incoming call(s) have been screened.
   0 incoming call(s) rejected for callback.

BRI0:1 - dialer type = ISDN
   Idle timer (120 secs), Fast idle timer (20 secs)
   Wait for carrier (30 secs), Re-enable (15 secs)
   Dialer state is shutdown

BRI0:2 - dialer type = ISDN
   Idle timer (120 secs), Fast idle timer (20 secs)
   Wait for carrier (30 secs), Re-enable (15 secs)
   Dialer state is shutdown

ROUTER1# show bridge

Total of 300 station blocks, 298 free
   Codes: P - permanent, S - self

Bridge Group 1:

 Address Action Interface Age RX count TX count
   0000.0c76.2882 forward Serial0 0 5 4
!--- Bridging traffic goes through Serial0. 00d0.58ad.ae13 forward Ethernet0 0 42 5
```

Befehle auf ROUTER1 anzeigen, wenn die serielle0 nicht verfügbar ist

```
ROUTER1# show isdn status
```

```
    Global ISDN Switchtype = basic-5ess
    ISDN BRI0 interface
    dsl 0, interface ISDN Switchtype = basic-5ess
    Layer 1 Status:
    ACTIVE
    Layer 2 Status:
    TEI = 114, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
```

!--- ISDN L1 and L2 will be up (when Serial0 fails) !--- even if interesting traffic is not present. Layer 3 Status: 1 **Active Layer 3 Call(s)**

```
    Activated dsl 0 CCBs = 1
    CCB:callid=8484, sapi=0, ces=1, B-chan=1, calltype=DATA
    The Free Channel Mask: 0x80000002
    Total Allocated ISDN CCBs = 1

ROUTER1# show dialer

BRI0 - dialer type = ISDN

Dial String Successes Failures Last DNIS Last status
    5552000 30 977 00:00:16 successful
    0 incoming call(s) have been screened.
    0 incoming call(s) rejected for callback.

BRI0:1 - dialer type = ISDN
    Idle timer (120 secs), Fast idle timer (20 secs)
    Wait for carrier (30 secs), Re-enable (15 secs)
    Dialer state is data link layer up
    Dial reason: bridge (0xFFFF)
    Time until disconnect 106 secs
    Connected to 5552000 (ROUTER2)

BRI0:2 - dialer type = ISDN
    Idle timer (120 secs), Fast idle timer (20 secs)
    Wait for carrier (30 secs), Re-enable (15 secs)
    Dialer state is idle

ROUTER1# show bridge

Total of 300 station blocks, 298 free
    Codes: P - permanent, S - self

Bridge Group 1:

 Address Action Interface Age RX count TX count
    0000.0c76.2882 forward BRI0 0 5 4
```
!--- Bridging traffic now goes through BRI0. 00d0.58ad.ae13 forward Ethernet0 0 5 5

Fehlerbehebung

Dieser Abschnitt enthält Informationen zur Fehlerbehebung in Ihrer Konfiguration.

Ressourcen zur Fehlerbehebung

Verwenden Sie diese Ressourcen je nach Bedarf:

- ISDN-Technologieunterstützung
- Fehlerbehebung bei seriellen Leitungen
- HDLC Back-to-Back-Verbindungen

Befehle zur Fehlerbehebung

Bestimmte **show**-Befehle werden vom [Output Interpreter Tool](#) unterstützt (nur [registrierte](#) Kunden), mit dem Sie eine Analyse der **show**-Befehlsausgabe anzeigen können.

Hinweis: Bevor Sie **Debugbefehle** ausgeben, lesen Sie [die](#) Informationen [Wichtige Informationen über Debug-Befehle.](#)

- **debug dialer**: Stellt Informationen über Dialer-Schnittstellenereignisse bereit.
- **debug isdn event** (**debug isdn**) - Zeigt Debugmeldungen bezüglich der ISDN-Aktivität auf der Benutzerseite der ISDN-Schnittstelle an.
- **debug isdn q931** - Stellt Informationen zum Einrichten und Beenden von ISDN-Netzwerkverbindungen (L3) zwischen dem lokalen Router (Benutzerseite) und dem Netzwerk bereit.
- **debug isdn q921** - Zeigt Debugmeldungen zu den Zugriffsvorgängen auf der Sicherungsschicht (L2) an, die auf dem Router auf dem D-Channel (LAPD) der ISDN-Schnittstelle ausgeführt werden.
- **debug ppp negotiation**: Zeigt Debug-Meldungen bezüglich der Aushandlung von PPP-Optionen und NCP-Parametern (Network Control Protocol) an.
- **debug ppp authentication**: Zeigt Debugmeldungen für den Austausch von CHAP- und PAP-Paketen (Password Authentication Protocol) an.

debuggen der Ausgabe auf ROUTER1, wenn Serial0 ausfällt und ISDN-Anrufe entgegengenommen werden

```
ROUTER1# show debug
   Dial on demand:
   Dial on demand events debugging is on
   PPP:
   PPP authentication debugging is on
   PPP protocol negotiation debugging is on
   ISDN:
   ISDN events debugging is on
   ISDN Q921 packets debugging is on
   ISDN Q931 packets debugging is on

ROUTER1#
!--- Interface serial0 goes down. ROUTER1# 00:56:53: %LINK-3-UPDOWN: Interface Serial0, changed
state to down *Mar 1 00:56:53.103: ISDN BR0 EVENT: isdn_sw_cstate: State = 0, Old State = 6
00:56:53: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down *Mar 1 00:56:53.107: BR0:1
LCP: State is Closed *Mar 1 00:56:53.111: BR0:1 DDR: disconnecting call 00:56:53: %LINK-3-
UPDOWN: Interface BRI0:2, changed state to down *Mar 1 00:56:53.119: BR0:2 LCP: State is Closed
*Mar 1 00:56:53.119: BR0:2 DDR: disconnecting call *Mar 1 00:56:53.127: ISDN BR0 EVENT:
isdn_sw_cstate: State = 4, Old State = 6 *Mar 1 00:56:53.135: ISDN BR0 EVENT: isdn_sw_cstate:
State = 4, Old State = 6 *Mar 1 00:56:53.567: ISDN BR0: RX <- IDCKRQ ri=0 ai=127 *Mar 1
00:56:53.567: ISDN Recvd L1 prim 3 dsl 0 state 3 ctrl_state 0 *Mar 1 00:56:53.571: ISDN BR0: L1
persistent Deactivated *Mar 1 00:56:53.571: ISDN Recvd L1 prim 7 dsl 0 state 3 ctrl_state 0 *Mar
1 00:56:53.575: ISDN BR0: Recvd MPH_IIC_IND from L1 *Mar 1 00:56:53.575: ISDN Recvd L1 prim 7
dsl 0 state 3 ctrl_state 0 *Mar 1 00:56:53.579: ISDN BR0: Recvd MPH_IIC_IND from L1 *Mar 1
00:56:53.579: ISDN Recvd L1 prim 1 dsl 0 state 3 ctrl_state 0 *Mar 1 00:56:53.583: ISDN BR0: L1
is IF_ACTIVE *Mar 1 00:56:53.583: ISDN BR0 EVENT: isdn_sw_cstate: State = 4, Old State = 6 *Mar
1 00:56:53.587: ISDN BR0: L2-TERM: ces/tei=1/0 AWAIT_ESTABLISH->TERM_DOWN *Mar 1 00:56:53.591:
ISDN BR0: Incoming call id = 0x0010, dsl 0 *Mar 1 00:56:53.595: ISDN BR0: L2-TERM: ces/tei=1/0
TERM_DOWN->AWAIT_ESTABLISH 00:56:53: %LINK-3-UPDOWN: Interface BRI0, changed state to up *Mar 1
00:56:53.631: ISDN BR0 EVENT: isdn_sw_cstate: State = 4, Old State = 6 *Mar 1 00:56:53.655: ISDN
BR0: TX -> IDREQ ri=48769 ai=127 00:56:54: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0, changed state to down *Mar 1 00:56:54.387: ISDN BR0: RX <- IDCKRQ ri=0 ai=127 *Mar 1
```

```
00:56:55.655: ISDN BR0: TX -> IDREQ ri=42642 ai=127 *Mar 1 00:56:55.699: ISDN BR0: RX <- IDASSN
ri=42642 ai=68 *Mar 1 00:56:55.791: ISDN BR0: TX -> SABMEp c/r=0 sapi=0 tei=68 *Mar 1
00:56:55.823: ISDN BR0: RX <- UAf c/r=0 sapi=0 tei=68 00:56:55: %ISDN-6-LAYER2UP: Layer 2 for
Interface BR0, TEI 68 changed to up *Mar 1 00:56:55.831: ISDN BR0: L2-TERM: ces/tei=1/68
AWAIT_ESTABLISH->ESTABLISHED !--- Interesting traffic has not arrived yet from Host1, !--- but
ISDN L1 and L2 are up now. ROUTER1# show isdn stat
Global ISDN Switchtype = basic-5ess
ISDN BRI0 interface
        dsl 0, interface ISDN Switchtype = basic-5ess
    Layer 1 Status:
        ACTIVE
    Layer 2 Status:
        TEI = 68, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
        I_Queue_Len 0, UI_Queue_Len 0
    Layer 3 Status:
        0 Active Layer 3 Call(s)
    Active dsl 0 CCBs = 0
    The Free Channel Mask:  0x80000003
    Number of L2 Discards = 0, L2 Session ID = 34
    Total Allocated ISDN CCBs = 0
ROUTER1#
*Mar  1 00:57:25.839: ISDN BR0: TX -> RRp sapi=0 tei=68 nr=0
*Mar  1 00:57:25.871: ISDN BR0: RX <- RRf sapi=0 tei=68 nr=0
ROUTER1#

 !--- Interesting traffic arrives now, !--- which triggers ISDN Dialup (see below). *Mar 1
00:57:32.519: BR0 DDR: Dialing cause bridge (0xFFFF)
*Mar  1 00:57:32.519: BR0 DDR: Attempting to dial 5552000
*Mar  1 00:57:32.523: ISDN BR0: Outgoing call id = 0x800E, dsl 0
*Mar  1 00:57:32.527: ISDN BR0: Event: Call to 5552000 at 64 Kb/s
*Mar  1 00:57:32.527: ISDN BR0: process_bri_call(): call id 0x800E,
called_number 5552000, speed 64, call type DATA
*Mar  1 00:57:32.531: CCBRI_Go Fr Host InPkgInfo (Len=22) :
*Mar  1 00:57:32.535: 1 0 1 80 E 0 4 2 88 90 18
1 83 2C 7 35 35 35 32 30 30 30
*Mar  1 00:57:32.543:
*Mar  1 00:57:32.547: CC_CHAN_GetIdleChanbri: dsl 0
*Mar  1 00:57:32.547:      Found idle channel B1
*Mar  1 00:57:32.563: ISDN BR0: TX -> INFOc sapi=0 tei=68 ns=0 nr=0
i=0x08010E05040288901801832C0735353532303030
*Mar  1 00:57:32.583:     SETUP pd = 8  callref = 0x0E
*Mar  1 00:57:32.591:         Bearer Capability i = 0x8890
*Mar  1 00:57:32.599:         Channel ID i = 0x83
*Mar  1 00:57:32.603:         Keypad Facility i = '5552000'
*Mar  1 00:57:32.867: ISDN BR0: RX <- INFOc sapi=0 tei=68 ns=0 nr=1
i=0x08018E02180189
*Mar  1 00:57:32.875:     CALL_PROC pd = 8  callref = 0x8E
*Mar  1 00:57:32.883:         Channel ID i = 0x89
*Mar  1 00:57:32.899: ISDN BR0: TX -> RRr sapi=0 tei=68 nr=1
*Mar  1 00:57:32.907: CCBRI_Go Fr L3 pkt (Len=7) :
*Mar  1 00:57:32.907: 2 1 E 98 18 1 89
*Mar  1 00:57:32.911:
*Mar  1 00:57:32.915: ISDN BR0: LIF_EVENT: ces/callid 1/0x800E
 HOST_PROCEEDING
*Mar  1 00:57:32.919: ISDN BR0: HOST_PROCEEDING
*Mar  1 00:57:32.919: ISDN BR0: HOST_MORE_INFO
*Mar  1 00:57:33.159: ISDN BR0: RX <- INFOc sapi=0 tei=68 ns=1
 nr=1 i=0x08018E07
*Mar  1 00:57:33.167:     CONNECT pd = 8  callref = 0x8E
*Mar  1 00:57:33.183: ISDN BR0: TX -> RRr sapi=0 tei=68 nr=2
*Mar  1 00:57:33.191: CCBRI_Go Fr L3 pkt (Len=4) :
*Mar  1 00:57:33.191: 7 1 E 91
*Mar  1 00:57:33.195:
*Mar  1 00:57:33.199: ISDN BR0: LIF_EVENT: ces/callid 1/0x800E
```

```
 HOST_CONNECT
00:57:33: %LINK-3-UPDOWN: **Interface BRI0:1, changed state to up**
*Mar  1 00:57:33.215: ISDN: get_isdn_service_state():
idb 0x19F4D8 bchan 2 is_isdn 1 Not a Pri
*Mar  1 00:57:33.215: BR0:1 PPP: Treating connection as a callout
*Mar  1 00:57:33.219: BR0:1 PPP: Phase is ESTABLISHING,
 Active Open [0 sess, 1 load]
*Mar  1 00:57:33.223: BR0:1 LCP: O CONFREQ [Closed] id 27 len 15
*Mar  1 00:57:33.227: BR0:1 LCP:    AuthProto CHAP
 (0x0305C22305)
*Mar  1 00:57:33.231: BR0:1 LCP:    MagicNumber 0x6091A5F6
 (0x05066091A5F6)
*Mar  1 00:57:33.235: ISDN BR0: Event: Connected to 5552000
 on B1 at 64 Kb/s
*Mar  1 00:57:33.247: ISDN BR0: TX -> INFOc sapi=0 tei=68 ns=1 nr=2
 i=0x08010E0F
*Mar  1 00:57:33.251:      CONNECT_ACK pd = 8  callref = 0x0E
*Mar  1 00:57:33.267: BR0:1 LCP: I CONFREQ [REQsent] id 4 len 15
*Mar  1 00:57:33.271: BR0:1 LCP:    AuthProto CHAP
 (0x0305C22305)
*Mar  1 00:57:33.275: BR0:1 LCP:    MagicNumber 0x6062D6EA
 (0x05066062D6EA)
*Mar  1 00:57:33.279: BR0:1 LCP: O CONFACK [REQsent] id 4 len 15
*Mar  1 00:57:33.283: BR0:1 LCP:    AuthProto CHAP
 (0x0305C22305)
*Mar  1 00:57:33.287: BR0:1 LCP:    MagicNumber 0x6062D6EA
 (0x05066062D6EA)
*Mar  1 00:57:33.291: BR0:1 LCP: I CONFACK [ACKsent] id 27 len 15
*Mar  1 00:57:33.291: BR0:1 LCP:    AuthProto CHAP
 (0x0305C22305)
*Mar  1 00:57:33.295: BR0:1 LCP:    MagicNumber 0x6091A5F6
 (0x05066091A5F6)
*Mar  1 00:57:33.299: BR0:1 LCP: State is Open
*Mar  1 00:57:33.303: BR0:1 PPP: Phase is AUTHENTICATING,
 by both [0 sess, 1 load]
*Mar  1 00:57:33.307: BR0:1 CHAP: O CHALLENGE id 14
 len 28 from "ROUTER1"
*Mar  1 00:57:33.319: BR0:1 CHAP: I CHALLENGE id 4
 len 28 from "ROUTER2"
*Mar  1 00:57:33.327: BR0:1 CHAP: O RESPONSE id 4
 len 28 from "ROUTER1"
*Mar  1 00:57:33.335: ISDN BR0: RX <- RRr sapi=0
 tei=68 nr=2
*Mar  1 00:57:33.351: BR0:1 **CHAP: I SUCCESS** id 4
 len 4
*Mar  1 00:57:33.367: BR0:1 CHAP: I RESPONSE id 14
 len 28 from "ROUTER2"
*Mar  1 00:57:33.371: BR0:1 **CHAP: O SUCCESS** id 14
 len 4
*Mar  1 00:57:33.375: BR0:1 PPP: Phase is UP [0 sess, 0 load]
*Mar  1 00:57:33.379: BR0:1 BNCP: O CONFREQ [Closed] id 14
 len 4
*Mar  1 00:57:33.387: BR0:1 CDPCP: O CONFREQ [Closed] id 14
 len 4
*Mar  1 00:57:33.395: BR0:1 BNCP: I CONFREQ [REQsent] id 4
 len 4
*Mar  1 00:57:33.399: BR0:1 BNCP: O CONFACK [REQsent] id 4
 len 4
*Mar  1 00:57:33.403: BR0:1 IPCP: I CONFREQ [Not negotiated] id 4
 len 10
*Mar  1 00:57:33.407: BR0:1 IPCP:    Address 172.16.53.17
 (0x0306AC103511)
*Mar  1 00:57:33.415: BR0:1 LCP: O PROTREJ [Open] id 28
 len 16 protocol IPCP
```

```
(0x80210104000A0306AC103511)
*Mar  1 00:57:33.419: BR0:1 CDPCP: I CONFREQ [REQsent] id 4
 len 4
*Mar  1 00:57:33.423: BR0:1 CDPCP: O CONFACK [REQsent] id 4
 len 4
*Mar  1 00:57:33.427: BR0:1 BNCP: I CONFACK [ACKsent] id 14
 len 4
*Mar  1 00:57:33.431: BR0:1 BNCP: State is Open
*Mar  1 00:57:33.435: BR0:1 CDPCP: I CONFACK [ACKsent] id 14
 len 4
*Mar  1 00:57:33.439: BR0:1 CDPCP: State is Open
*Mar  1 00:57:33.443: BR0:1 DDR: dialer protocol up
00:57:34: %LINEPROTO-5-UPDOWN:
Line protocol on Interface BRI0:1, changed state to up
00:57:39: %ISDN-6-CONNECT: Interface BRI0:1 is now connected
 to 5552000 ROUTER2
ROUTER1#


ROUTER1# show isdn status
Global ISDN Switchtype = basic-5ess
ISDN BRI0 interface
        dsl 0, interface ISDN Switchtype = basic-5ess
    Layer 1 Status:
        ACTIVE
    Layer 2 Status:
        TEI = 68, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
        I_Queue_Len 0, UI_Queue_Len 0
    Layer 3 Status:
        1 Active Layer 3 Call(s)
        CCB:callid=800E, sapi=0, ces=1, B-chan=1, calltype=DATA
    Active dsl 0 CCBs = 1
    The Free Channel Mask:  0x80000002
    Number of L2 Discards = 0, L2 Session ID = 34
    Total Allocated ISDN CCBs = 1
*Mar  1 00:58:03.343: ISDN BR0: TX -> RRp sapi=0 tei=68 nr=2
*Mar  1 00:58:03.379: ISDN BR0: RX <- RRf sapi=0 tei=68 nr=2pann
ROUTER1# show spanning-tree

 Bridge group 1 is executing the ieee compatible Spanning Tree protocol
   Bridge Identifier has priority 32768, address 0060.5cf4.a9a8
   Configured hello time 2, max age 20, forward delay 15
   Current root has priority 32768, address 0060.5cf4.a955
   Root port is 3 (BRI0), cost of root path is 15625
   Topology change flag set, detected flag not set
   Number of topology changes 10 last change occurred 00:01:15 ago
   from Serial0
   Times: hold 1, topology change 35, notification 2
   hello 2, max age 20, forward delay 15
   Timers: hello 0, topology change 0, notification 0, aging 15

 Port 2 (Ethernet0) of Bridge group 1 is forwarding
   Port path cost 100, Port priority 128, Port Identifier 128.2.
   Designated root has priority 32768, address 0060.5cf4.a955
   Designated bridge has priority 32768, address 0060.5cf4.a9a8
   Designated port id is 128.2, designated path cost 15625
   Timers: message age 0, forward delay 0, hold 0
   Number of transitions to forwarding state: 2
   BPDU: sent 751, received 0

 Port 3 (BRI0) of Bridge group 1 is forwarding
```
!--- BRI Interface forwards the bridged traffic now. Port path cost 15625, Port priority 128,
Port Identifier 128.3. Designated root has priority 32768, address 0060.5cf4.a955 Designated
bridge has priority 32768, address 0060.5cf4.a955 Designated port id is 128.3, designated path
cost 0 Timers: message age 2, forward delay 0, hold 0 Number of transitions to forwarding state:

```
3 BPDU: sent 1014, received 608 Port 6 (Serial0) of Bridge group 1 is down
   Port path cost 647, Port priority 128, Port Identifier 128.6.
   Designated root has priority 32768, address 0060.5cf4.a955
   Designated bridge has priority 32768, address 0060.5cf4.a9a8
   Designated port id is 128.6, designated path cost 15625
   Timers: message age 0, forward delay 0, hold 0
   Number of transitions to forwarding state: 1
   BPDU: sent 15, received 27


ROUTER1#
   *Mar 1 00:58:33.387: ISDN BR0: TX -> RRp sapi=0 tei=68 nr=2
   *Mar 1 00:58:33.423: ISDN BR0: RX <- RRf sapi=0 tei=68 nr=2
```

Debug-Ausgabe auf ROUTER1, wenn Serial0 wieder kommt und ISDN den Anruf beendet

```
00:58:37: %LINK-3-UPDOWN: Interface Serial0, changed state to up
   *Mar 1 00:58:37.671: BR0:1 DDR: disconnecting call
   *Mar 1 00:58:37.675: BR0:2 DDR: disconnecting call
   *Mar 1 00:58:37.675: ISDN BR0: Event: Hangup call to call id 0x800E
   *Mar 1 00:58:37.679: ISDN BR0: process_disconnect(): call id 0x800E,
    call type is DATA, b_idb 0x19F4D8, ces 1, cause Normal call
   clearing(0x10)
   00:58:37: %ISDN-6-DISCONNECT: Interface BRI0:1 disconnected from
   5552000 ROUTER2, call lasted 64 seconds
   *Mar 1 00:58:37.691: ISDN: get_isdn_service_state(): idb 0x19F4D8
    bchan 2 is_isdn 1 Not a Pri
   *Mar 1 00:58:37.695: CCBRI_Go Fr Host InPkgInfo (Len=13) :
   *Mar 1 00:58:37.699: 5 0 1 80 E 3 8 1 90 8 2 80 90
   *Mar 1 00:58:37.703:
   *Mar 1 00:58:37.719: ISDN BR0: TX -> INFOc sapi=0 tei=68 ns=2 nr=2
    i=0x08010E4508028090
   *Mar 1 00:58:37.727: DISCONNECT pd = 8 callref = 0x0E
   *Mar 1 00:58:37.735: Cause i = 0x8090 - Normal call clearing
   *Mar 1 00:58:37.743: ISDN BR0 EVENT: isdn_sw_cs!!!!!!!!!!!!!!!!!!!!tate:
    State = 6, Old State = 4
   00:58:37: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down
   *Mar 1 00:58:37.751: BR0:1 BNCP: State is Closed
   *Mar 1 00:58:37.755: BR0:1 CDPCP: State is Closed
   *Mar 1 00:58:37.755: BR0:1 PPP: Phase is TERMINATING [0 sess, 1 load]
   *Mar 1 00:58:37.759: BR0:1 LCP: State is Closed
   *Mar 1 00:58:37.763: BR0:1 PPP: Phase is DOWN [0 sess, 1 load]
   *Mar 1 00:58:37.763: BR0:1 DDR: disconnecting call
   *Mar 1 00:58:37.775: ISDN Recvd L1 prim 3 dsl 0 state 1 ctrl_state 0
   *Mar 1 00:58:37.779: ISDN BR0: Physical layer is IF_DOWN
   *Mar 1 00:58:37.783: ISDN BR0: Shutting down ME
   00:58:37: %ISDN-6-LAYER2DOWN: Layer 2 for Interface BRI0,
    TEI 68 changed to down
   *Mar 1 00:58:37.791: ISDN BR0: L2-TERM: ces/tei=1/68
    ESTABLISHED->TERM_DOWN
   *Mar 1 00:58:37.795: ISDN BR0: LIF_EVENT: ces/callid 1/0x800E
    HOST_DISCONNECT_ACK
   *Mar 1 00:58:37.803: ISDN: get_isdn_service_state(): idb 0x19F4D8
    bchan 2 is_isdn 1 Not a Pri
   *Mar 1 00:58:37.807: ISDN BR0: HOST_DISCONNECT_ACK: call type is DATA
   00:58:37: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down
   *Mar 1 00:58:37.815: BR0:1 LCP: State is Closed
   *Mar 1 00:58:37.815: BR0:1 DDR: disconnecting call
   *Mar 1 00:58:37.819: ISDN BR0: Shutting down ISDN Layer 3
   00:58:37: %ISDN-6-LAYER2DOWN: Layer 2 for Interface BR0,
    TEI 68 changed to down
   00:58:37: %LINK-5-CHANGED: Interface BRI0, changed state to standby mode
```

```
*Mar 1 00:58:37.847: ISDN BR0 EVENT: isdn_sw_cstate: State = 6,
Old State = 4
00:58:37: %LINK-3-UPDOWN: Interface BRI0:2, changed state to down
*Mar 1 00:58:37.855: BR0:2 LCP: State is Closed
*Mar 1 00:58:37.855: BR0:2 DDR: disconnecting call
*Mar 1 00:58:37.895: ISDN BR0: Incoming call id = 0x0011, dsl 0
*Mar 1 00:58:37.895: ISDN BR0: L2-TERM: ces/tei=1/0
 TERM_DOWN->AWAIT_ESTABLISH
*Mar 1 00:58:37.935: ISDN BR0: Activating
00:58:38: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0,
changed state to up
00:58:38: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to down
*Mar 1 00:58:39.939: ISDN BR0: Could not bring up interface
*Mar 1 00:58:39.943: ISDN BR0: Shutting down ISDN Layer 3
*Mar 1 00:58:39.963: ISDN BR0: Activating
*Mar 1 00:58:41.943: ISDN BR0: Could not bring up interface
*Mar 1 00:58:41.947: ISDN BR0: Shutting down ISDN Layer 3
*Mar 1 00:58:41.947: ISDN BR0: Activating
ROUTER1#

ROUTER1# show isdn status
Global ISDN Switchtype = basic-5ess
ISDN BRI0 interface
dsl 0, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
DEACTIVATED
Layer 2 Status:
Layer 2 NOT Activated
```
!--- ISDN L1 and L2 are back to the deactivated state. Layer 3 Status: 0 Active Layer 3 Call(s)
Active dsl 0 CCBs = 0 The Free Channel Mask: 0x80000003 Number of L2 Discards = 0, L2 Session ID
= 39 Total Allocated ISDN CCBs = 0 ROUTER1# *Mar 1 00:58:49.951: ISDN BR0: Could not bring up
interface *Mar 1 00:58:49.951: ISDN BR0: Shutting down ISDN Layer 3 ROUTER1# ROUTER1# **show
spanning-tree**

```
 Bridge group 1 is executing the ieee compatible Spanning Tree protocol
   Bridge Identifier has priority 32768, address 0060.5cf4.a9a8
   Configured hello time 2, max age 20, forward delay 15
   Current root has priority 32768, address 0060.5cf4.a955
   Root port is 6 (Serial0), cost of root path is 647
   Topology change flag not set, detected flag not set
   Number of topology changes 13 last change occurred 00:28:23 ago
   from Serial0
   Times: hold 1, topology change 35, notification 2
   hello 2, max age 20, forward delay 15
   Timers: hello 0, topology change 0, notification 0, aging 300

 Port 2 (Ethernet0) of Bridge group 1 is forwarding
   Port path cost 100, Port priority 128, Port Identifier 128.2.
   Designated root has priority 32768, address 0060.5cf4.a955
   Designated bridge has priority 32768, address 0060.5cf4.a9a8
   Designated port id is 128.2, designated path cost 647
   Timers: message age 0, forward delay 0, hold 0
   Number of transitions to forwarding state: 2
   BPDU: sent 1633, received 0
```

 Port 3 (BRI0) of **Bridge group 1 is down**
!--- BRI0 is in the down state when Serial 0 is up. Port path cost 15625, Port priority 128,
Port Identifier 128.3. Designated root has priority 32768, address 0060.5cf4.a955 Designated
bridge has priority 32768, address 0060.5cf4.a9a8 Designated port id is 128.3, designated path
cost 647 Timers: message age 0, forward delay 0, hold 0 Number of transitions to forwarding
state: 3 BPDU: sent 1014, received 622 Port 6 (Serial0) of **Bridge group 1 is forwarding**
!--- Serial0 forwards the bridged traffic now. Port path cost 647, Port priority 128, Port
Identifier 128.6. Designated root has priority 32768, address 0060.5cf4.a955 Designated bridge

```
has priority 32768, address 0060.5cf4.a955 Designated port id is 128.6, designated path cost 0
Timers: message age 1, forward delay 0, hold 0 Number of transitions to forwarding state: 2
BPDU: sent 18, received 896 ROUTER1#
```

Zugehörige Informationen

- Überbrückung über ISDN
- BRI-ISDN-Backup mit Backup-Schnittstelle
- Konfigurieren von BRI Multilink ISDN Backup mit Dialer Watch
- Konfigurieren der BRI ISDN-Sicherung mit Dialer Watch
- Konfigurieren von ISDN-Backup mit Floating Static Routes
- DDR-Sicherung mithilfe von BRIs und dem Befehl "backup interface"
- Konfigurieren der BRI-Backup-Schnittstelle mit Dialer-Profilen
- Konfigurieren von DDR-Backups mithilfe von BRIs und Dialer Watch
- Konfigurieren des ISDN-Backups für WAN-Links über Floating Static Routes
- Konfigurieren von Frame-Relay-Backup
- Konfigurieren der Wählsicherung für serielle Leitungen
- Befehle für Cisco IOS-Wähldienste
- Unterstützung von DFÜ- und Zugriffstechnologie
- Technischer Support und Dokumentation - Cisco Systems