

ISDN DDR 使用 HDLC 封装

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简介

有两个不同的方式使用在ISDN的高级数据链路控制(HDLC)：

- 定义物理接口运行HDLC。换句话说，因为HDLC是Cisco IOS软件，使用的默认封装封装没有定义。这是原始方式配置与按需拨号路由(DDR)的HDLC和讨论在本文。
- 绑定您希望的协议的使用拨号接口(在本例中，HDLC)对一特定拨号程序。这是新方法并且允许一个特定物理接口处理多个协议(例如，点对点协议[PPP]和HDLC)。因为协议在拨号接口配置，物理接口没有限制。此方法在[ISDN DDR](#)被称作作为动态多重封装和讨论[使用HDLC封装与动态多重封装](#)。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- 路由器taxbol和goya是用于实验室环境清除配置的2500系列路由器。
- Cisco IOS软件版本11.2(22)在两路由器使用。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原

始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

为什么使用 HDLC？

原因为什么用户需要在ISDN的HDLC不是显然的，因为有很多缺点与PPP比较。唯一的目的是将简单化配置。然而，它也简化对路由器的访问所有黑客的。HDLC不支持任何验证，因此此处最好的保护是验证呼叫号码用 `isdn caller` 命令在您的接口。参考 [配置Cli放映](#) 或 [ISDN认证和回拨与呼叫方ID](#) 其他信息的。Calling line ID (CLID) 基于验证假设，您的Telco供应在ISDN建立消息的呼叫号码。然而，因为许多Telco不供应CLID，请验证与您的Telco，在您配置基于CLID的过滤前。如果Telco没有供应CLID，则所有呼入呼叫到路由器里发生故障。

HDLC另一个缺点是路由器不安装动态映射。所以，dialer map 需要为HDLC对等体配置(在每个末端)。

注意： 如果仅一端做呼叫(例如，一个路由器总是接受呼叫并且不拨出)确保，您在接收端的拨号映射语句包括一名称对于远端对等体。然而，名称可以是一假名称，因为路由器没有方式验证对等体名称确定是否匹配dialer map映射名字。

例如，这是说明，并且此ISDN编号是8130。

```
ip address 172.16.1.6 255.255.255.252
isdn caller 8129
!--- This is to accept only calls from 8129. dialer map ip 172.16.1.5 name
bogus_to_accept_command
!--- This is a dialer-map with a fake name. dialer-group 1
```

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

本文档使用此图所示的网络设置。

配置

```
goya
Current configuration:
!
version 11.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname goya
```

```

!
isdn switch-type basic-net3
!--- The switch-type used is basic-net3. If you are in
the United States, !--- configure the correct switch-
type (for example !--- isdn switch-type basic-5ess). In
the US, you also need to !--- configure the spids under
the Basic Rate Interface (BRI) interface.

!
interface Ethernet0
 ip address 10.1.1.1 255.255.255.0
 no ip redirects
!
interface BRI0
!--- If you are in the US do not forget the SPID !---
(for example isdn spid1 01555.....) description This
ISDN number is 8129 ip address 172.16.1.5
255.255.255.252 dialer idle-timeout 60 !--- The idle is
set to 60 seconds. isdn caller 8130 !--- Verify the
incoming number since there is no authentication on
HDLC. dialer map ip 172.16.1.6 8130 !--- This side is
making the call to 8130. dialer-group 1 ! ip classless
ip route 0.0.0.0 0.0.0.0 172.16.1.6 access-list 105
permit icmp any any !--- This access-list is to debug
ICMP only. dialer-list 1 protocol ip permit ! line con 0
exec-timeout 0 0 transport input none line aux 0 line
vty 0 4 exec-timeout 0 0 no login ! end

```

traxbol

Current configuration:

```

!
version 11.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname traxbol
!

isdn switch-type basic-net3
!--- The switch-type used here is basic-net3. If you are
in the United States, !--- configure the correct switch-
type (for example !--- isdn switch-type basic-5ess). In
the United States, you also need to !--- configure the
SPIDs under the BRI interface. ! Interface Ethernet0 ip
address 10.1.2.1 255.255.255.0 no ip redirects !
interface BRI0 !--- If you are in the United States, do
not forget the SPID !--- (for example isdn spid1
01555.....).

description This ISDN number is 8130
 ip address 172.16.1.6 255.255.255.252
 isdn caller 8129
!--- Verify the incoming number since there is no
authentication on HDLC. dialer map ip 172.16.1.5 name
goya !--- This side will not make any calls, but "name
goya" is added to complete the !--- command. This is
because a static dialer map is necessary. dialer-group 1
! ip classless ip route 0.0.0.0 0.0.0.0 172.16.1.5
access-list 105 permit icmp any any !--- This access-
list is to debug ICMP only. dialer-list 1 protocol ip
permit ! line con 0 exec-timeout 0 0 line aux 0 line vty

```

```
0 4 exec-timeout 0 0 password ww login ! end
```

验证

本部分提供的信息可帮助您确认您的配置是否可正常运行。

[命令输出解释程序工具](#) ([仅限注册用户](#)) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

- **show interfaces bri number** -指定仅编号显示该BRI接口的D-channel。

封装未在配置里定义，那么默认情况下它是HDLC。这可以用**show interface**命令验证如显示此处：

```
goya#show interfaces bri 0
BRI0 is up, line protocol is up (spoofing)
Hardware is BRI
Description: This ISDN number is 8129
Internet address is 172.16.1.5/30
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
Encapsulation HDLC, loopback not set
!--- HDLC is configured automatically Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters never Input queue: 0/75/0 (size/max/drops); Total
output drops: 0 Queueing strategy: weighted fair Output queue: 0/1000/64/0 (size/max
total/threshold/drops) Conversations 0/1/256 (active/max active/max total) Reserved
Conversations 0/0 (allocated/max allocated) 5 minute input rate 0 bits/sec, 0 packets/sec 5
minute output rate 0 bits/sec, 0 packets/sec 3933 packets input, 20462 bytes, 0 no buffer
Received 15 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0
overrun, 0 ignored, 0 abort 3926 packets output, 26100 bytes, 0 underruns 0 output errors, 0
collisions, 10 interface resets 0 output buffer failures, 0 output buffers swapped out 7 carrier
transitions
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除命令

注意：在发出 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- **debug dialer**
- **debug ip packet detail 105** —使用对debug ip是仅ICMP (的数据包请参阅access-list 105在配置里)。
- **debug isdn q931** —用于发现ISDN Q.931事件和数据包。
- **debug serial interface** —用于调试HDLC。

两路由器调试示例显示此处：

从goya的输出：

```
goya#debug dialer
Dial on demand events debugging is on
goya#debug ip packet detail 105
IP packet debugging is on (detailed) for access list 105
goya#debug isdn q931
```

ISDN Q931 packets debugging is on

!--- Verify that the map is correctly configured. goya#**show dialer map**

Static dialer map ip 172.16.1.6 name traxbol (8130) on BRI0

goya#ping? 172.16.1.6

!--- Ping to the remote destination. Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to 172.16.1.6, timeout is 2 seconds: *Mar? 1 05:40:07.230: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), len 100, sending *!--- The Ping attempts to leave the router.* *Mar? 1 05:40:07.234:???? ICMP type=8, code=0 *Mar? 1 05:40:07.238: BRI0: Dialing cause ip (s=172.16.1.5, d=172.16.1.6) *Mar? 1 05:40:07.238: BRI0: Attempting to dial 8130 *!--- The dialer attempts the call.* *Mar? 1 05:40:07.242: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), Len 100, encapsulation failed *!--- This is because the HDLC is not ready. !-- Therefore, the encapsulation failed.* *Mar? 1 05:40:07.246:???? ICMP type=8, code=0 *Mar? 1 05:40:07.258: ISDN BR0: TX ->? SETUP pd = 8? callref = 0x37 *Mar? 1 05:40:07.258:???????? Bearer Capability i = 0x8890 *Mar? 1 05:40:07.262:???????? Channel ID i = 0x83 *Mar? 1 05:40:07.266:???????? Called Party Number i = 0x80, '8130' *Mar? 1 05:40:07.318: ISDN BR0: RX <-? CALL_PROC pd = 8? callref = 0xB7 *Mar? 1 05:40:07.322:???????? Channel ID i = 0x89 *Mar? 1 05:40:07.470: ISDN BR0: RX <-? CONNECT pd = 8? callref = 0xB7 *Mar? 1 05:40:07.486: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up *Mar? 1 05:40:07.514: ISDN BR0: TX ->? CONNECT_ACK pd = 8? callref = 0x37 *!--- The call is made.* *Mar? 1 05:40:07.!!!! *!--- One ping packet was lost because the encapsulation was not ready.* Success rate is 80 percent (4/5), round-trip min/avg/max = 52/58/76 ms goya#.518: dialer Protocol up for BR0:1 *Mar? 1 05:40:07.526: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1, changed state to up *Mar? 1 05:40:09.230: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), Len 100, sending *Mar? 1 05:40:09.234:???? ICMP type=8, code=0 *Mar? 1 05:40:09.278: IP: s=172.16.1.6 (BRI0), d=172.16.1.5 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:09.278:???? ICMP type=0, code=0 *Mar? 1 05:40:09.282: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), Len 100, sending *Mar? 1 05:40:09.286:???? ICMP type=8, code=0 *Mar? 1 05:40:09.330: IP: s=172.16.1.6 (BRI0), d=172.16.1.5 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:09.334:???? ICMP type=0, code=0 *Mar? 1 05:40:09.338: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), Len 100, sending *Mar? 1 05:40:09.338:???? ICMP type=8, code=0 *Mar? 1 05:40:09.406: IP: s=172.16.1.6 (BRI0), d=172.16.1.5 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:09.410:???? ICMP type=0, code=0 *Mar? 1 05:40:09.414: IP: s=172.16.1.5 (local), d=172.16.1.6 (BRI0), Len 100, sending *Mar? 1 05:40:09.418:???? ICMP type=8, code=0 *Mar? 1 05:40:09.462: IP: s=172.16.1.6 (BRI0), d=172.16.1.5 (BRI0), Len 100, rcvd 3 *!--- Other four ping packets are successful.* *Mar? 1 05:40:09.466:???? ICMP type=0, code=0 goya# *Mar? 1 05:40:13.674: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to 8130 traxbol !? *!--- View the dialer.* ! goya#**show dialer**

BRI0 - dialer type = ISDN

Dial String????? Successes?? Failures??? Last called?? Last status
8130???????????????????? 299???????? 10??? 00:00:11???????? successful
0 incoming call(s) have been screened.

BRI0:1 - dialer type = ISDN

Idle timer (60 secs), Fast idle timer (20 secs)

Wait for carrier (30 secs), Re-enable (15 secs)

Dialer state is data link layer up

!--- The next two lines tell who triggered the call !-- and the time remaining before disconnect. Dial reason: ip (s=172.16.1.5, d=172.16.1.6) Time until disconnect 50 secs Connected to 8130 (traxbol) BRI0:2 - dialer type = ISDN Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier (30 secs), Re-enable (15 secs) Dialer state is idle goya# ! *!--- View the HDLC.*

! goya#**debug serial interface?**

Serial network interface debugging is on

goya#ping 172.16.1.6

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.16.1.6, timeout is 2 seconds:

!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 32/93/328 ms

goya#

*Mar? 1 06:35:03.266: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up

*Mar? 1 06:35:03.814: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1, changed state to up

*Mar? 1 06:35:04.822: BRI0:1: HDLC myseq 0, mineseen 0, yourseen 0, line up?

*Mar? 1 06:35:09.846: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to 8130 traxbol

Mar? 1 06:35:14.826: BRI0:1: HDLC myseq 1, mineseen 1, yourseen 1, line up?

```
*Mar? 1 06:35:24.838: BRI0:1: HDLC myseq 2, mineseen 2*, yourseen 2, line up?
*Mar? 1 06:35:34.842: BRI0:1: HDLC myseq 3, mineseen 3*, yourseen 3, line up?
*Mar? 1 06:35:44.846: BRI0:1: HDLC myseq 4, mineseen 4*, yourseen 4, line up?
*Mar? 1 06:35:54.850: BRI0:1: HDLC myseq 5, mineseen 5*, yourseen 5, line up?
*Mar? 1 06:36:03.862: %ISDN-6-DISCONNECT: Interface BRI0:1? disconnected from
      8130 traxbol, call lasted 60 seconds
*Mar? 1 06:36:03.974: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down
*Mar? 1 06:36:04.858: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
      changed state to down
```

goya#**undebg all**

All possible debugging has been turned off

goya#

从traxbol的输出 :

traxbol#**debug dialer**

Dial on demand events debugging is on

traxbol#**debug ip packet detail 105**

IP packet debugging is on (detailed) for access list 105

traxbol#**debug isdn q931**

ISDN Q931 packets debugging is on

!--- Verify that the map is correctly configured. traxbol#**show dialer map**

Static dialer map ip 172.16.1.5 name goya (8129) on BRI0

traxbol#

!--- A call is received, notice that the calling party !--- matches the ISDN caller

configuration. *Mar? 1 05:40:30.898: ISDN BR0: RX <-? SETUP pd = 8? callref = 0x15 *Mar? 1
05:40:30.898:???????? Bearer Capability i = 0x8890 *Mar? 1 05:40:30.902:???????? Channel ID i =
0x89 *Mar? 1 05:40:30.906:???????? Calling Party Number i = 0xA1, '8129' *Mar? 1
05:40:30.906:???????? Called Party Number i = 0xC1, '8130' *Mar? 1 05:40:30.918: %LINK-3-UPDOWN:
Interface BRI0:1, changed state to up *Mar? 1 05:40:30.954: ISDN BR0: TX ->? CONNECT pd = 8?
callref = 0x95 *Mar? 1 05:40:30.958: dialer Protocol up for BR0:1 *Mar? 1 05:40:31.014: ISDN
BR0: RX <-? CONNECT_ACK pd = 8? callref = 0x15 *Mar? 1 05:40:31.018:???????? Channel ID i = 0x89
*Mar? 1 05:40:31.862: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1, changed state to
up *!--- debug ip packet detail 105 shows the ICMPs on this router.* *Mar? 1 05:40:32.794: IP:
s=172.16.1.5 (BRI0), d=172.16.1.6 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:32.798:???? ICMP type=8,
code=0 *Mar? 1 05:40:32.802: IP: s=172.16.1.6 (local), d=172.16.1.5 (BRI0), Len 100, sending
*Mar? 1 05:40:32.802:???? ICMP type=0, code=0 *Mar? 1 05:40:32.850: IP: s=172.16.1.5 (BRI0),
d=172.16.1.6 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:32.854:???? ICMP type=8, code=0 *Mar? 1
05:40:32.854: IP: s=172.16.1.6 (local), d=172.16.1.5 (BRI0), Len 100, sending *Mar? 1
05:40:32.858:???? ICMP type=0, code=0 *Mar? 1 05:40:32.926: IP: s=172.16.1.5 (BRI0),
d=172.16.1.6 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:32.930:???? ICMP type=8, code=0 *Mar? 1
05:40:32.930: IP: s=172.16.1.6 (local), d=172.16.1.5 (BRI0), Len 100, sending *Mar? 1
05:40:32.934:???? ICMP type=0, code=0 *Mar? 1 05:40:32.982: IP: s=172.16.1.5 (BRI0),
d=172.16.1.6 (BRI0), Len 100, rcvd 3 *Mar? 1 05:40:32.982:???? ICMP type=8, code=0 *Mar? 1
05:40:32.986: IP: s=172.16.1.6 (local), d=172.16.1.5 (BRI0), Len 100, sending *Mar? 1
05:40:32.990:???? ICMP type=0, code=0 *Mar? 1 05:40:36.994: %ISDN-6-CONNECT: Interface BRI0:1 is
now connected to 8129 goya ! *!--- On the dialer, the call is received. !--- There is no dial
reason. However, the idle has been using the !--- default 120 seconds since nothing was
configured. !--- The router GOYA closes !--- the call earlier because the idle is set to 60
seconds on that side.* ! traxbol#**show dialer**

BRI0 - dialer type = ISDN

Dial String????? Successes?? Failures??? Last called?? Last status
8129???????????????????????????????? 0???????????? 0??? never???????????????????????? -
10 incoming call(s) have been screened.

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
Time until disconnect 103 secs
Connected to 8129 (goya)

```
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
traxbol#
!
!--- View the HDLC. ! traxbol#debug serial interface
Serial network interface debugging is on
traxbol#
*Mar? 1 06:35:26.674: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up
*Mar? 1 06:35:26.698: Ser-Autodetect BR0:1: no autodetect configuration
*Mar? 1 06:35:27.534: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
  changed state to up
*Mar? 1 06:35:31.554: BRI0:1: HDLC myseq 0, mineseen 0*, yourseen 1, line up?
*Mar? 1 06:35:33.578: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to 8129
  goya
*Mar? 1 06:35:41.598: BRI0:1: HDLC myseq 1, mineseen 1*, yourseen 2, line up?
*Mar? 1 06:35:51.702: BRI0:1: HDLC myseq 2, mineseen 2*, yourseen 3, line up?
*Mar? 1 06:36:01.746: BRI0:1: HDLC myseq 3, mineseen 3*, yourseen 4, line up?
*Mar? 1 06:36:11.790: BRI0:1: HDLC myseq 4, mineseen 4*, yourseen 5, line up?
*Mar? 1 06:36:21.894: BRI0:1: HDLC myseq 5, mineseen 5*, yourseen 6, line up?
*Mar? 1 06:36:27.510: %ISDN-6-DISCONNECT: Interface BRI0:1? disconnected from 8129
  goya, call lasted 60 seconds
*Mar? 1 06:36:27.514: %LINK-3-UPDOWN: Interface BRI0:1, changed state to down
*Mar? 1 06:36:27.922: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
  changed state to down
traxbol#undebg all
All possible debugging has been turned off
traxbol#
```

相关信息

- [利用 Dialer Profiles 来配置 ISDN DDR](#)
- [通过 DDR 拨号映射配置 BRI 之间的拨号](#)
- [技术支持 - Cisco Systems](#)