

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),
```

