

DDR de ISDN usando o encapsulamento HDLC

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[Introduction](#)

Há duas maneiras diferentes de se usar o HDLC (High-Level Data Link Control) em ISDN:

- Defina a interface física para executar o HDLC. Em outras palavras, nenhum encapsulamento é definido porque o HDLC é o encapsulamento padrão usado pelo Cisco IOS® Software. Este é o modo original de configurar HDLC com Dial-on-Demand Routing (DDR) e é discutido neste documento.
- Use a interface do discador para vincular o protocolo que deseja (nesse exemplo, HDLC) a um discador específico. Este é o método mais novo e permite a uma interface física específica tratar protocolos múltiplos (por exemplo, Point-to-Point Protocol [PPP] e HDLC). Como o protocolo é configurado na interface do discador, a interface física não é restrita. Este método é conhecido como Encapsulamentos múltiplos dinâmicos e discutido em [ISDN DDR Utilizando Encapsulamento HDLC com Vários Encapsulamentos Dinâmicos](#).

[Prerequisites](#)

[Requirements](#)

Não existem requisitos específicos para este documento.

[Componentes Utilizados](#)

As informações neste documento são baseadas nestas versões de software e hardware:

- Os roteadores taxbol e goya são 2500 Series Routers usados em um ambiente de laboratório com as configurações apagadas.
- O Cisco IOS Software Release 11.2(22) é utilizado em ambos os roteadores.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Para obter mais informações sobre convenções de documento, consulte as [Convenções de dicas técnicas Cisco](#).

Por que utilizar o HDLC?

A razão pela qual um usuário exige o HDLC no ISDN não é óbvia, porque ele que tem muitas desvantagens em comparação ao PPP. A única finalidade é simplificar a configuração. Contudo, ele também simplifica o acesso ao roteador para todos os hackers. Como HDLC não oferece suporte a nenhum tipo de autenticação, a melhor proteção aqui seria verificar o número chamado com o comando `isdn caller` na interface. Consulte [Configuração de Triagem CLI ou Autenticação ISDN e Retorno de Chamada com ID de Chamador para obter informações adicionais](#). A autenticação com base em CLID (Identificação de Linha Chamadora) admite que sua Telco fornece o número chamador nas mensagens de instalação ISDN. Contudo, como muitas Telcos não fornecem CLID, verifique com sua Telco antes que você configure a triagem baseada no CLID. Se o CLID não for fornecido pela Telco, todas as chamadas recebidas no roteador falharão.

Uma outra desvantagem do HDLC é que o roteador não instala um mapa dinâmico. Por isso, um mapa de discadores precisa ser configurado (em cada extremidade) para o peer HDLC.

Observação: se apenas um lado fizer a chamada (por exemplo, um roteador sempre aceita a chamada e não disca), certifique-se de incluir um nome para o peer remoto na instrução `dialer map` do lado receptor. Contudo, o nome pode ser um nome falsificado porque o roteador não tem nenhuma maneira de autenticar o nome do peer para determinar se corresponde ao nome de mapa de discadores.

Por exemplo, esta é uma descrição e este número ISDN é 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
```

Configurar

Nesta seção, você encontrará informações para configurar os recursos descritos neste documento.

Observação: para encontrar informações adicionais sobre os comandos usados neste documento, use a [ferramenta Command Lookup](#)

Diagrama de Rede

Este documento utiliza a configuração de rede mostrada neste diagrama.



Configurações

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
goia !--- This side will not make any calls, but "name
goia" 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

```

Verificar

Esta seção fornece informações que você pode usar para confirmar se sua configuração funciona adequadamente.

A [Output Interpreter Tool \(somente clientes registrados\)](#) oferece suporte a determinados comandos show, o que permite exibir uma análise da saída do comando show.

- **show interfaces bri number-** Especificar somente o número exibe o canal D para essa interface BRI.

Como nenhum encapsulamento foi definido na configuração, por padrão é HDLC. Isso pode ser verificado com o comando **show interface** como mostrado aqui:

```

goia#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

Troubleshoot

Esta seção fornece informações que podem ser usadas para o troubleshooting da sua configuração.

Comandos para Troubleshooting

Observação: antes de inserir o comando **debug**, consulte [Informações importantes sobre os comandos debug](#).

- **debug dialer**
- **debug ip packet detail 105** — Usado para depurar pacotes IP que são somente ICMP (consulte a lista de acesso 105 na configuração).
- **debug isdn q931** — Usado para ver o evento e pacotes ISDN Q.931.
- **debug serial interface** — Usado para debugar o HDLC.

Exemplos de depuração de ambos os roteadores são mostrados aqui:

A saída de goya:

```
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#undebug all
```

```
All possible debugging has been turned off
```

```
goya#
```

A saída de traxbol:

```
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#undebug all
```

```
All possible debugging has been turned off
```

```
traxbol#
```

[Informações Relacionadas](#)

- [Configuração de ISDN e DDR com perfis de discagem](#)
- [Configurando o Dialup BRI-to-BRI com os mapas de discadores DDR](#)
- [Suporte Técnico - Cisco Systems](#)