DDR ISDN mediante encapsulado HDLC

Contenido

Introducción

Existen dos modos diferentes de usar High-Level Data Link Control (HDLC) sobre ISDN:

- Defina la interfaz física para ejecutar HDLC. En otras palabras, no se define ninguna encapsulación ya que HDLC es la encapsulación predeterminada utilizada por el software Cisco IOS®. Esta es la forma original de configurar HDLC con el enrutamiento de marcado a pedido (DDR) y se describe en este documento.
- Utilice la interfaz del marcador para vincular el protocolo que desee (en este ejemplo, HDLC) a un marcador específico. Este es el método más reciente y permite que una interfaz física específica controle varios protocolos (por ejemplo, el protocolo punto a punto [PPP] y el HDLC). Dado que el protocolo está configurado en la interfaz del marcador, la interfaz física no está restringida. Este método se conoce como Encapsulaciones Múltiples Dinámicas y se discute en ISDN DDR usando Encapsulación HDLC con Encapsulaciones Múltiples Dinámicas.

Prerequisites

Requirements

No hay requisitos específicos para este documento.

Componentes Utilizados

La información que contiene este documento se basa en las siguientes versiones de software y hardware.

- Los routers Taxbol y Goya son routers de la serie 2500 que se utilizan en un entorno de laboratorio con configuraciones verificadas.
- La versión 11.2(22) del software del IOS de Cisco se utiliza en ambos routers.

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.

Convenciones

Para obtener más información sobre las convenciones del documento, consulte Convenciones de Consejos Técnicos de Cisco.

¿Por qué se usa HDLC?

La razón por la que un usuario requiere HDLC en ISDN no es obvia, ya que tiene muchas desventajas comparadas con PPP. El único propósito es simplificar la configuración. Sin embargo, también simplifica el acceso al router para cualquier hacker. HDLC no soporta ningún tipo de autenticación, por lo tanto la mejor protección aquí sería verificar el número que llama con el comando **isdn caller** en su interfaz. Consulte Configuración de la Detección de CLI o Autenticación y Devolución de Llamada ISDN con ID de la persona que llama para obtener información adicional. La autenticación basada en el ID de la línea que llama (CLID) asume que su compañía telefónica suministra el número de origen de la llamada en los mensajes de configuración ISDN. Sin embargo, dado que muchas empresas de telecomunicaciones no proporcionan CLID, verifique con su compañía telefónica antes de configurar el filtrado basado en CLID. Si la compañía telefónica no proporciona CLID, todas las llamadas entrantes al router fallan.

Otra desventaja de HDLC es que el router no instala un mapa dinámico. Por lo tanto, es necesario configurar un mapa del marcador (en cada extremo) para el par HDLC.

Nota: Si sólo un lado realiza la llamada (por ejemplo, un router siempre acepta la llamada y no realiza el marcado), asegúrese de incluir un nombre para el par remoto en la instrucción dialer map del lado receptor. Sin embargo, el nombre puede ser un nombre falso ya que el router no tiene forma de autenticar el nombre del peer para determinar si coincide con el nombre del mapa del marcador.

Por ejemplo, esta es una descripción y este número ISDN es 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

En esta sección encontrará la información para configurar las funciones descritas en este documento.

Nota: Para obtener información adicional sobre los comandos utilizados en este documento, utilice la [herramienta Command Lookup](#)

Diagrama de la red

Este documento utiliza la configuración de red que se muestra en el siguiente diagrama.

Configuraciones

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                │
└─────────────────────────────────────────────────────────────┘
```

Verificación

En esta sección encontrará información que puede utilizar para comprobar que su configuración funcione correctamente.

La herramienta Output Interpreter (sólo para clientes registrados) permite utilizar algunos comandos "show" y ver un análisis del resultado de estos comandos.

- **show interfaces bri** *number* - Al especificar sólo el número, se muestra el canal D para esa interfaz BRI.

No se definió ninguna encapsulación en la configuración, por lo que de forma predeterminada es HDLC. Esto se puede verificar con el comando **show interface** como se muestra aquí:

```
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
```

Troubleshoot

En esta sección encontrará información que puede utilizar para solucionar problemas de
configuración.

Comandos para resolución de problemas

Nota: Antes de ejecutar un comando **debug**, consulte [Información Importante sobre Comandos
Debug](#).

- **debug dialer**
- **debug ip packet detail 105**: se utiliza para depurar paquetes IP que sólo son ICMP (consulte
  la lista de acceso 105 en la configuración).
- **debug isdn q931**: se utiliza para ver el evento ISDN Q.931 y los paquetes.
- **debug serial interface**: se utiliza para depurar el HDLC.

Aquí se muestran ejemplos de depuración de ambos routers:

El resultado 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#
```

La salida 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#
```

Información Relacionada

- Configuración de ISDN DDR con perfiles de marcado
- Configuración del marcado manual BRI a BRI con correspondencias de marcador de DDR
- Soporte Técnico - Cisco Systems