

Servicio repetido entre un Cisco 3640 Router y un usuario remoto en el modo de V.110

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Introducción

Este documento ofrece un ejemplo de configuración de las llamadas entrantes de usuarios remotos que se realizan por uno de los siguientes métodos. Para cada caso, la devolución de llamada se realiza utilizando una llamada V.110.

- Conexión de usuarios 3640 a través de GSM y solicitud de devolución de llamada.
- Usuarios que conectan 3640 a través de un módem y solicitan la devolución de llamada.
- Usuarios que conecten 3640 vía ISDN (datos) y soliciten devolución de llamada.

Note: El Authentication, Authorization, and Accounting (AAA) se configura en el router por abandono. Usted debe también crear a un usuario para iniciar sesión.

En este ejemplo, también hemos fijado la autenticación del Point-to-Point Protocol (PPP) para el callin y el reclamo. Hemos cambiado el script para configurar el módem para V.110 todo el tiempo, y para permitir que los usuarios elijan su método (módem o GS). Dependiendo del método elegido, los usuarios deben:

- utilice ZDTxxx en el número de devolución de llamada (para el módem).
- use DIxxxx en el número de retorno de llamada (para GSM).

prerrequisitos

Requisitos

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.

- ¿La característica de devolución de llamada de V.110 está disponible en el IOS de Rosa??
Software Release 12.2(5.2)T y Posterior.
- Software del módem versión 2.7.3.0.

La información que contiene este documento se creó a partir de los dispositivos en un ambiente de laboratorio específico. Todos los dispositivos que se utilizan en este documento se pusieron en funcionamiento con una configuración verificada (predeterminada). Si la red está funcionando, asegúrese de haber comprendido el impacto que puede tener cualquier comando.

Convenciones

Para obtener más información sobre las convenciones del documento, consulte [Convenciones de Consejos Técnicos de Cisco](#).

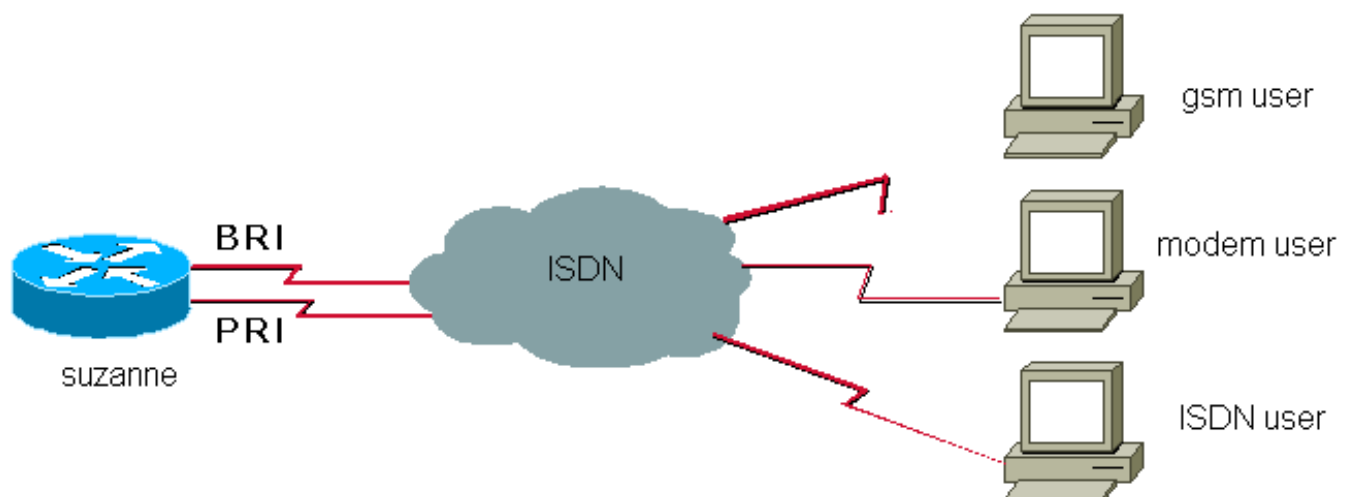
Configurar

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

Note: Para obtener información adicional sobre los comandos que se utilizan en este documento, use la Command Lookup Tool (solo para clientes [registrados](#)).

Diagrama de la red

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



Configuraciones

Este documento usa esta configuración:

- Susana

Susana

```
suzanne#show running-config
!
version 12.2
service internal
!
hostname susanne
!
aaa new-model
!
aaa authentication login default local
aaa authentication ppp default local
aaa authorization network default local
aaa session-id common
!
username ww password 0
username alainisdn password 0
username alaingsm callback-dialstring "" password 0
username alainmod callback-dialstring "" password 0
!
modem country mica belgium
!
isdn switch-type primary-net5
isdn voice-call-failure 0
chat-script offhook "" "ATH1" OK
chat-script callback ABORT ERROR ABORT BUSY "" "AT&F"
OK "ATX3DT \T" TIMEOUT 90 \c
chat-script callbacklanalog ABORT ERROR ABORT BUSY ""
"AT&F"
OK "ATDT \T" TIMEOUT 90 CONNECT \c
chat-script callback2gsm ABORT ERROR ABORT BUSY ""
"AT&F"
OK "ATS29=8" OK "AT \T" TIMEOUT 90 CONNECT \c
!
controller E1 1/0
pri-group timeslots 1-31
!
interface Ethernet0/0
ip address 172.17.243.105 255.255.255.0
!
interface Serial1/0:15
description E1 0451/39920
no ip address
encapsulation ppp
dialer rotary-group 1
isdn switch-type primary-net5
isdn incoming-voice modem
isdn outgoing-voice info-transfer-capability 3.1kHz-
audio
no cdp enable
ppp authentication chap callin
!
interface BRI3/1
description belgacom 027202094
no ip address
encapsulation ppp
isdn switch-type basic-net3
isdn incoming-voice modem
```

```

no cdp enable
!
interface Group-Async1
ip unnumbered Dialer1
encapsulation ppp
dialer in-band
dialer callback-secure
dialer-group 1
async dynamic routing
async mode interactive
peer default ip address pool pool
ppp callback accept
ppp authentication pap
group-range 65 94
!
interface Dialer1
description Dial-In User
ip address 172.31.1.1 255.255.0.0
ip helper-address 90.100.48.38
ip helper-address 90.100.60.202
encapsulation ppp
dialer in-band
dialer callback-secure
dialer map ip 172.31.1.2 name alainisdn class callback
6136
peer default ip address pool pool
no cdp enable
ppp callback accept
ppp authentication chap callin
!
map-class dialer callback
dialer callback-server username
dialer-list 1 protocol ip permit
!
line con 0
exec-timeout 0 0
password
line 65 94
script dialer callback2gsm
script callback callback2gsm
modem InOut
transport input telnet
transport output pad v120 lapb-ta telnet rlogin udptn
autoselect during-login
autoselect ppp
stopbits 1
flowcontrol hardware
line aux 0
password
line vty 0 4
exec-timeout 0 0
password
!
end

```

Verificación

En esta sección encontrará información que puede utilizar para confirmar que su configuración esté funcionando correctamente.

La herramienta [Output Interpreter](#) (sólo para clientes [registrados](#)) permite utilizar algunos

comandos “show” y ver un análisis del resultado de estos comandos.

- ¿muestre la ruta de IP??? visualiza el contenido de la tabla de IP Routing

Troubleshooting

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

Note: Antes de que usted publique los **comandos debug**, refiera a la [información importante en los comandos Debug](#).

- **módem del debug** — observar la actividad de línea del módem en un servidor de acceso.
- **eventos del debug dialer** — información de debugging de las visualizaciones sobre los paquetes recibidos en una interfaz del dialer.
- **autenticación PPP del debug** — mensajes de protocolo de la autenticación de las visualizaciones, incluyendo los intercambios de paquetes del protocolo challenge authentication (GRIETA) y los intercambios del protocolo password authentication (PAP).
- **debug ppp cbcp** — errores del protocolo y estadísticas de las visualizaciones asociados a las negociaciones de la conexión PPP usando el protocolo microsoft callback control (MSCB).
- información de las visualizaciones del **debug ISDN Q931** — sobre la configuración de la llamada y cierre de las conexiones de red ISDN (capa 3) entre el router local (lado del usuario) y la red.
- **charla del debug** — verifica que esté funcionando el chat script correctamente.
- **debug callback** — eventos de devolución de llamada de las visualizaciones cuando el router está utilizando un módem y un chat script a la devolución de llamada en un línea de la terminal.

Ejemplo de resultado del comando debug

Devolución de llamada GSM mediante el uso de V.110

```
suzanne#
01:03:00: ISDN BR3/1: RX <- SETUP pd = 8 callref = 0x2F
01:03:00: Sending Complete
01:03:00: Bearer Capability i = 0x9090A3
01:03:00: Channel ID i = 0x89
01:03:00: Calling Party Number i = 0x21, 0x83, '478681006', Plan:ISDN,
Type:National
01:03:00: Called Party Number i = 0xA1, '27202094', Plan:ISDN, Type:National
01:03:00: ISDN BR3/1: Event: Received a VOICE call from 478681006 on B1 at 64 Kb/s
01:03:00: ISDN BR3/1: Event: Accepting the call id 0x19
01:03:00: %ISDN-6-LAYER2UP: Layer 2 for Interface BR3/1, TEI 70 changed to up
01:03:00: ISDN BR3/1: TX -> CALL_PROC pd = 8 callref = 0xAF
01:03:00: Channel ID i = 0x89
01:03:00: ISDN BR3/1: TX -> ALERTING pd = 8 callref = 0xAF
01:03:00: ISDN BR3/1: TX -> CONNECT pd = 8 callref = 0xAF
01:03:01: ISDN BR3/1: RX <- CONNECT_ACK pd = 8 callref = 0x2F
01:03:01: Modem 2/12 Mica: configured for Answer mode,
with Null signaling,0x0 tone detection.
01:03:01: Modem 2/12 Mica: in modem state CALL_SETUP
```

01:03:02: Modem 2/12 Mica: in modem state CONNECT
01:03:06: Modem 2/12 Mica: in modem state LINK
01:03:07: %ISDN-6-CONNECT: Interface BRI3/1:1 is now connected to 478681006
01:03:15: Modem 2/12 Mica: in modem state TRAINUP
01:03:17: Modem 2/12 Mica: in modem state EC_NEGOTIATING
01:03:18: Modem 2/12 Mica: in modem state STEADY
01:03:18: Modem 2/12 Mica: CONNECT at 31200/31200 (Tx/Rx), V34+, LAPM, None
01:03:19: TTY77: DSR came up
01:03:19: tty77: Modem: IDLE->(unknown)
01:03:19: TTY77: EXEC creation
01:03:19: TTY77: set timer type 10, 30 seconds
01:03:19: TTY77: Autoselect(2) sample 7E
01:03:19: TTY77: Autoselect(2) sample 7EFF
01:03:19: TTY77: Autoselect(2) sample 7EFF7D
01:03:19: TTY77: Autoselect(2) sample 7EFF7D23
01:03:19: TTY77 Autoselect cmd: ppp negotiate
01:03:19: TTY77: EXEC creation
01:03:19: TTY77: create timer type 1, 600 seconds
01:03:19: TTY77: destroy timer type 1
01:03:19: TTY77: no timer type 0 to destroy
01:03:19: As77 DDR: Dialer received incoming call from <unknown>
01:03:21: %LINK-3-UPDOWN: Interface Async77, changed state to up
01:03:21: As77 DDR: Dialer statechange to up
01:03:21: As77 DDR: Dialer received incoming call from <unknown>
01:03:21: As77 PPP: Treating connection as a callin
01:03:21: As77 PPP: Authorization required
01:03:22: Modem 2/12 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0
01:03:22: As77 PPP: Authorization required
01:03:27: Modem 2/12 Mica: PPP escape_map: Tx map = A0000, Rx map = 0
01:03:27: As77 MCB: Initialize
01:03:27: MCB: Flush
01:03:27: Modem 2/12 Mica: Bad RX Frame: control = 0xE007, length = 0xD,
buffer = 0x3BC6E54
01:03:30: As77 PAP: I AUTH-REQ id 2 len 16 from "alaingsm"
01:03:30: As77 PAP: Authenticating peer alaingsm
01:03:30: As77 PPP: Sent PAP LOGIN Request to AAA
01:03:30: As77 PPP: Received LOGIN Response from AAA = PASS
01:03:30: As77 DDR: Remote name for alaingsm
01:03:30: As77 DDR: Authenticated host alaingsm with no matching dialer map
01:03:30: As77 PAP: O AUTH-ACK id 2 len 5
01:03:30: As77 MCB: Start
01:03:30: As77 MCB: User alaingsm Callback Number - Client ANY
01:03:30: As77 MCB: Newstate 0-INIT -> 2-WAIT_RESPONSE
01:03:30: As77 MCB: O Request Id 1 Callback Type Client-Num delay 0
01:03:32: As77 MCB: Timeout in state WAIT_RESPONSE sending new Request 2
01:03:32: As77 MCB: O Request Id 2 Callback Type Client-Num delay 0
01:03:34: As77 MCB: Timeout in state WAIT_RESPONSE sending new Request 3
01:03:34: As77 MCB: O Request Id 3 Callback Type Client-Num delay 0
01:03:35: Async77 PPP: I MCB Response(2) id 1 len 22
01:03:35: Async77 MCB:
I 2 1 0 16 2 12 F 1 44 49 30 30 34 37 38 36 38 31 30 30 36 0
01:03:35: As77 MCB: Received response
01:03:35: As77 MCB: Resp ignored. ID Expected 3, got id 1
01:03:36: As77 MCB: Timeout in state WAIT_RESPONSE sending new Request 4
01:03:36: As77 MCB: O Request Id 4 Callback Type Client-Num delay 0
01:03:36: Async77 PPP: I MCB Response(2) id 4 len 22
01:03:36: Async77 MCB:
I 2 4 0 16 2 12 F 1 44 49 30 30 34 37 38 36 38 31 30 30 36 0
01:03:36: As77 MCB: Received response

!--- You can see here that "DI00478681006" was entered at the user PC. 01:03:36: As77 MCB:
Response CBK-Client-Num 2 18 15, addr 1-DI00478681006 01:03:36: As77 MCB: O Ack Id 5 Callback
Type Client-Num delay 15 01:03:36: As77 MCB: Negotiated MCB with peer 01:03:36: As77 MCB:
Newstate 2-WAIT_RESPONSE -> 3-WAIT_TERMINATE 01:03:37: As77 MCB: Peer terminating the link

01:03:37: As77 MCB: Newstate 3-WAIT_TERMINATE -> 5-WAIT_LINKDOWN 01:03:37: As77 MCB: Link terminated by peer, Callback Needed 01:03:37: As77 MCB: Newstate 5-WAIT_LINKDOWN -> 6-CALLING 01:03:37: As77 MCB: Initiate Callback for ^->o`iB@ at DI00478681006 using Async DDR 01:03:37: As77 DDR: PPP callback Callback server starting to alaingsm DI00478681006 01:03:37: As77 MCB: Dialer callback started *!--- Call is disconnected.* 01:03:38: Modem 2/12 Mica: in modem state SS_RETRAINING 01:03:38: ISDN BR3/1: RX <- DISCONNECT pd = 8 callref = 0x2F 01:03:38: Cause i = 0x8090 - Normal call clearing 01:03:38: Progress Ind i = 0x8088 - In-band info or appropriate now available 01:03:38: %ISDN-6-DISCONNECT: Interface BRI3/1:1 disconnected from 478681006, call lasted 37 seconds 01:03:38: ISDN BR3/1: TX -> RELEASE pd = 8 callref = 0xAF 01:03:38: Cause i = 0x8090 - Normal call clearing 01:03:38: Modem 2/12 Mica: in modem state TERMINATING 01:03:38: ISDN BR3/1: RX <- RELEASE_COMP pd = 8 callref = 0x2F 01:03:39: TTY77: Async Int reset: Dropping DTR 01:03:39: Modem 2/12 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0 01:03:39: As77 PPP: Authorization required 01:03:40: Modem 2/12 Mica: in modem state IDLE 01:03:40: Modem 2/12 Mica: DISCONNECT after 00:00:38, due to reason (0xDF00) Host Disconnect. 01:03:40: TTY77: DSR was dropped 01:03:40: tty77: Modem: READY->(unknown) 01:03:41: TTY77: dropping DTR, hanging up 01:03:41: tty77: Modem: HANGUP->(unknown) 01:03:41: %LINK-5-CHANGED: Interface Async77, changed state to reset 01:03:42: TTY77: cleanup pending. Delaying DTR 01:03:43: TTY77: cleanup pending. Delaying DTR 01:03:44: TTY77: cleanup pending. Delaying DTR 01:03:44: TTY77: no timer type 0 to destroy 01:03:44: TTY77: no timer type 1 to destroy 01:03:44: TTY77: no timer type 3 to destroy 01:03:44: TTY77: no timer type 4 to destroy 01:03:44: TTY77: no timer type 2 to destroy 01:03:44: Async77: allowing modem_process to continue hangup 01:03:45: TTY77: restoring DTR 01:03:46: %LINK-3-UPDOWN: Interface Async77, changed state to down 01:03:53: %ISDN-6-LAYER2DOWN: Layer 2 for Interface BR3/1, TEI 70 changed to down *!--- Callback is started.* 01:03:56: As77 DDR: re-enable timeout 01:03:56: DDR: callback triggered by dialer_timers 01:03:56: As77 DDR: beginning callback to alaingsm DI00478681006 01:03:56: As77 DDR: Attempting to dial DI00478681006 01:03:56: CHAT77: Attempting async line dialer script 01:03:56: CHAT77: Dialing using Modem script: callback2gsm & System script: none 01:03:56: CHAT77: process started 01:03:56: CHAT77: Asserting DTR 01:03:56: CHAT77: Chat script callback2gsm started 01:03:56: CHAT77: Sending string: AT&F 01:03:56: CHAT77: Expecting string: OK 01:03:56: CHAT77: Completed match for expect: OK 01:03:56: CHAT77: Sending string: ATS29=8 01:03:56: CHAT77: Expecting string: OK 01:03:56: CHAT77: Completed match for expect: OK *!--- We send DI00478681006* 01:03:56: CHAT77: Sending string: AT \T<DI00478681006> 01:03:56: CHAT77: Expecting string: CONNECT 01:03:56: Modem 2/12 Mica: configured for Originate mode, with Null signaling, 0x1 tone detection. 01:03:56: Modem 2/12 Mica: received dialstring 00478681006 01:03:56: ISDN Se1/0:15: TX -> SETUP pd = 8 callref = 0x000E 01:03:56: Bearer Capability i = 0x8890214846BB 01:03:56: Channel ID i = 0xA9839F 01:03:56: Called Party Number i = 0x81, '00478681006', Plan:ISDN, Type:Unknown 01:03:56: Low Layer Compat i = 0x8890214846BB 01:03:56: ISDN Se1/0:15: RX <- CALL_PROC pd = 8 callref = 0x800E 01:03:56: Channel ID i = 0xA9839F 01:03:56: Modem 2/12 Mica: in modem state CALL_SETUP 01:04:02: ISDN Se1/0:15: RX <- ALERTING pd = 8 callref = 0x800E 01:04:03: ISDN Se1/0:15: RX <- CONNECT pd = 8 callref = 0x800E 01:04:03: ISDN Se1/0:15: TX -> CONNECT_ACK pd = 8 callref = 0x000E 01:04:03: Modem 2/12 Mica: in modem state CONNECT 01:04:03: Modem 2/12 Mica: in modem state LINK 01:04:03: Modem 2/12 Mica: in modem state TRAINUP 01:04:03: Modem 2/12 Mica: in modem state EC_NEGOTIATING 01:04:03: Modem 2/12 Mica: in modem state STEADY 01:04:03: CHAT77: Completed match for expect: CONNECT 01:04:03: CHAT77: Sending string: \c 01:04:03: CHAT77: Chat script callback2gsm finished, status = Success 01:04:03: TTY77: no timer type 1 to destroy 01:04:03: TTY77: no timer type 0 to destroy 01:04:03: Modem 2/12 Mica: CONNECT at 9600/9600 (Tx/Rx), V110, V.110, None 01:04:04: As77 PPP: Treating connection as a callout 01:04:04: Modem 2/12 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0 01:04:04: As77 PPP: Authorization required 01:04:04: %LINK-3-UPDOWN: Interface Async77, changed state to up 01:04:04: As77 DDR: Dialer statechange to up 01:04:04: As77 DDR: Copying MS callback dialstring DI00478681006 to ddb 01:04:04: DDR: Freeing callback to alaingsm DI00478681006 01:04:04: As77 DDR: Dialer call has been placed 01:04:08: Modem 2/12 Mica: PPP escape_map: Tx map = A0000, Rx map = 0 01:04:08: As77 MCB: Initialize 01:04:08: Modem 2/12 Mica: Bad RX Frame: control = 0xE007, length = 0xD, buffer = 0x3BC6E54 01:04:09: %ISDN-6-CONNECT: Interface Serial1/0:30 is now connected to 00478681006 01:04:11: As77 PAP: I AUTH-REQ id 2 len 16 from "alaingsm" 01:04:11: As77 PAP: Authenticating peer alaingsm 01:04:11: As77 PPP: Sent PAP LOGIN Request to AAA 01:04:11: As77 PPP: Received LOGIN Response from AAA = PASS 01:04:11: As77 DDR: Remote name for alaingsm 01:04:11: As77 DDR: Authenticated host alaingsm with no matching dialer map 01:04:11: As77 PAP: O AUTH-ACK id 2 len 5 01:04:13: As77 DDR: dialer protocol up **suzanne#show ip route**

Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP

D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area

N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2 E1 - OSPF external type 1,

E2 - OSPF external type 2, E - EGP

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 172.17.243.1 to network 0.0.0.0

172.17.0.0/24 is subnetted, 1 subnets
C 172.17.243.0 is directly connected, Ethernet0/0
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.31.1.28/32 is directly connected, Async77
C 172.31.0.0/16 is directly connected, Dialer1
S* 0.0.0.0/0 [1/0] via 172.17.243.1

suzanne#ping 172.31.1.28

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 172.31.1.28, timeout is 2 seconds:

!!!!!

Success rate is 100 percent (5/5), round-trip min/avg/max = 784/858/880 ms

suzanne#

01:04:49: ISDN Se1/0:15: RX <- DISCONNECT pd = 8 callref = 0x800E
01:04:49: Cause i = 0x8090 - Normal call clearing
01:04:49: %ISDN-6-DISCONNECT: Interface Serial1/0:30 disconnected from
00478681006, call lasted 46 seconds
01:04:49: ISDN Se1/0:15: TX -> RELEASE pd = 8 callref = 0x000E
01:04:49: Modem 2/12 Mica: in modem state TERMINATING
01:04:49: ISDN Se1/0:15: RX <- RELEASE_COMP pd = 8 callref = 0x800E
01:04:49: Modem 2/12 Mica: in modem state IDLE
01:04:49: Modem 2/12 Mica: DISCONNECT after 00:00:46,
due to reason (0xDF00) Host Disconnect.
01:04:50: TTY77: DSR was dropped
01:04:50: tty77: Modem: READY->(unknown)
01:04:51: TTY77: Async Int reset: Dropping DTR
01:04:51: Modem 2/12 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0
01:04:51: As77 PPP: Authorization required
01:04:51: TTY77: dropping DTR, hanging up
01:04:51: tty77: Modem: HANGUP->(unknown)
01:04:52: TTY77: cleanup pending. Delaying DTR
01:04:53: %LINK-5-CHANGED: Interface Async77, changed state to reset
01:04:53: TTY77: cleanup pending. Delaying DTR
01:04:54: TTY77: cleanup pending. Delaying DTR
01:04:55: TTY77: cleanup pending. Delaying DTR
01:04:56: TTY77: no timer type 0 to destroy
01:04:56: TTY77: no timer type 1 to destroy
01:04:56: TTY77: no timer type 3 to destroy
01:04:56: TTY77: no timer type 4 to destroy
01:04:56: TTY77: no timer type 2 to destroy
01:04:56: Async77: allowing modem_process to continue hangup
01:04:56: TTY77: restoring DTR
01:04:58: %LINK-3-UPDOWN: Interface Async77, changed state to down
01:05:08: As77 DDR: re-enable timeout

[Devolución de llamada del módem mediante el uso de V.110](#)

!--- Modem callback using default of MICA (modem dialing US robotics). suzanne# 01:06:21: ISDN
Se1/0:15: RX <- SETUP pd = 8 callref = 0x6D73 01:06:21: Sending Complete 01:06:21: Bearer
Capability i = 0x9090A3 01:06:21: Channel ID i = 0xA18387 01:06:21: Progress Ind i = 0x8183 -
Origination address is non-ISDN 01:06:21: Calling Party Number i = 0xA1, '6020', Plan:ISDN,
Type:National 01:06:21: Called Party Number i = 0x81, '214', Plan:ISDN, Type:Unknown 01:06:21:
ISDN Se1/0:15: TX -> CALL_PROC pd = 8 callref = 0xED73 01:06:21: Channel ID i = 0xA98387

01:06:21: ISDN Sel/0:15: TX -> ALERTING pd = 8 callref = 0xED73 01:06:21: ISDN Sel/0:15: TX ->
CONNECT pd = 8 callref = 0xED73 01:06:21: ISDN Sel/0:15: RX <- CONNECT_ACK pd = 8 callref =
0x6D73 01:06:21: ISDN Sel/0:15: CALL_PROGRESS: CALL_CONNECTED call id 0x1A, bchan 6, dsl 0
01:06:21: Modem 2/13 Mica: configured for Answer mode, with Null signaling, 0x0 tone detection.
01:06:21: Modem 2/13 Mica: in modem state CALL_SETUP 01:06:22: Modem 2/13 Mica: in modem state
CONNECT 01:06:26: Modem 2/13 Mica: in modem state LINK 01:06:27: %ISDN-6-CONNECT: Interface
Serial1/0:6 is now connected to 6020 01:06:34: Modem 2/13 Mica: in modem state TRAINUP 01:06:36:
Modem 2/13 Mica: in modem state EC_NEGOTIATING 01:06:36: Modem 2/13 Mica: in modem state STEADY
01:06:36: Modem 2/13 Mica: CONNECT at 9600/9600 (Tx/Rx), V34+, LAPM, None 01:06:37: TTY78: DSR
came up 01:06:37: tty78: Modem: IDLE->(unknown) 01:06:37: TTY78: EXEC creation 01:06:37: TTY78:
set timer type 10, 30 seconds 01:06:40: TTY78: Autoselect(2) sample 7E 01:06:40: TTY78:
Autoselect(2) sample 7EFF 01:06:40: TTY78: Autoselect(2) sample 7EFF7D 01:06:40: TTY78:
Autoselect(2) sample 7EFF7D23 01:06:40: TTY78 Autoselect cmd: ppp negotiate 01:06:40: TTY78:
EXEC creation 01:06:40: TTY78: create timer type 1, 600 seconds 01:06:40: TTY78: destroy timer
type 1 01:06:40: TTY78: no timer type 0 to destroy 01:06:40: As78 DDR: Dialer received incoming
call from <unknown> 01:06:42: %LINK-3-UPDOWN: Interface Async78, changed state to up 01:06:42:
As78 DDR: Dialer statechange to up 01:06:42: As78 DDR: Dialer received incoming call from
<unknown> 01:06:42: As78 PPP: Treating connection as a callin 01:06:42: As78 PPP: Authorization
required 01:06:43: Modem 2/13 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0 01:06:43: As78
PPP: Authorization required 01:06:47: Modem 2/13 Mica: PPP escape_map: Tx map = A0000, Rx map =
0 01:06:47: As78 MCB: Initialize 01:06:47: MCB: Flush 01:06:47: Modem 2/13 Mica: Bad RX Frame:
control = 0xE007, length = 0xE, buffer = 0x3BC9014 01:06:50: As78 PAP: I AUTH-REQ id 2 len 16
from "alainmod" 01:06:50: As78 PAP: Authenticating peer alainmod 01:06:50: As78 PPP: Sent PAP
LOGIN Request to AAA 01:06:50: As78 PPP: Received LOGIN Response from AAA = PASS 01:06:50: As78
DDR: Remote name for alainmod 01:06:50: As78 DDR: Authenticated host alainmod with no matching
dialer map 01:06:50: As78 PAP: O AUTH-ACK id 2 len 5 01:06:50: As78 MCB: Start 01:06:50: As78
MCB: User alainmod Callback Number - Client ANY 01:06:50: As78 MCB: Newstate 0-INIT -> 2-
WAIT_RESPONSE 01:06:50: As78 MCB: O Request Id 1 Callback Type Client-Num delay 0 01:06:52: As78
MCB: Timeout in state WAIT_RESPONSE sending new Request 2 01:06:52: As78 MCB: O Request Id 2
Callback Type Client-Num delay 0 01:06:54: As78 MCB: Timeout in state WAIT_RESPONSE sending new
Request 3 01:06:54: As78 MCB: O Request Id 3 Callback Type Client-Num delay 0 01:06:54: Async78
PPP: I MCB Response(2) id 1 len 17 01:06:54: Async78 MCB: I 2 1 0 11 2 D F 1 5A 44 54 20 36 30
32 30 0 01:06:54: As78 MCB: Received response 01:06:54: As78 MCB: Resp ignored. ID Expected 3,
got id 1 01:06:56: As78 MCB: Timeout in state WAIT_RESPONSE sending new Request 4 01:06:56: As78
MCB: O Request Id 4 Callback Type Client-Num delay 0 01:06:56: Async78 PPP: I MCB Response(2) id
4 len 17 01:06:56: Async78 MCB: I 2 4 0 11 2 D F 1 5A 44 54 20 36 30 32 30 0 01:06:56: As78 MCB:
Received response 01:06:56: As78 MCB: Response CBK-Client-Num 2 13 15, addr 1-ZDT 6020 01:06:56:
As78 MCB: O Ack Id 5 Callback Type Client-Num delay 15 01:06:56: As78 MCB: Negotiated MCB with
peer 01:06:56: As78 MCB: Newstate 2-WAIT_RESPONSE -> 3-WAIT_TERMINATE 01:06:56: As78 MCB: Peer
terminating the link 01:06:56: As78 MCB: Newstate 3-WAIT_TERMINATE -> 5-WAIT_LINKDOWN 01:06:56:
As78 MCB: Link terminated by peer, Callback Needed 01:06:56: As78 MCB: Newstate 5-WAIT_LINKDOWN
-> 6-CALLING 01:06:56: As78 MCB: Initiate Callback for ^->o`iB@ at ZDT 6020 using Async DDR
01:06:56: As78 DDR: PPP callback Callback server starting to alainmod ZDT 6020 01:06:56: As78
MCB: Dialer callback started 01:06:57: Modem 2/13 Mica: in modem state TERMINATING 01:06:57:
Modem 2/13 Mica: in modem state IDLE 01:06:57: %ISDN-6-DISCONNECT: Interface Serial1/0:6
disconnected from 6020, call lasted 36 seconds 01:06:57: ISDN Sel/0:15: TX -> DISCONNECT pd = 8
callref = 0xED73 01:06:57: Cause i = 0x8090 - Normal call clearing 01:06:57: Modem 2/13 Mica:
DISCONNECT after 00:00:35, due to reason (0x8220) EC rcvd DISC frame. 01:06:57: TTY78: DSR was
dropped 01:06:57: tty78: Modem: READY->(unknown) 01:06:57: ISDN Sel/0:15: RX <- RELEASE pd = 8
callref = 0x6D73 01:06:57: ISDN Sel/0:15: TX -> RELEASE_COMP pd = 8 callref = 0xED73 01:06:58:
TTY78: dropping DTR, hanging up 01:06:58: TTY78: Async Int reset: Dropping DTR 01:06:58: tty78:
Modem: HANGUP->(unknown) 01:06:59: TTY78: cleanup pending. Delaying DTR 01:06:59: Modem 2/13
Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0 01:06:59: As78 PPP: Authorization required
01:07:00: %LINK-5-CHANGED: Interface Async78, changed state to reset 01:07:00: TTY78: cleanup
pending. Delaying DTR 01:07:01: TTY78: cleanup pending. Delaying DTR 01:07:02: TTY78: cleanup
pending. Delaying DTR 01:07:03: TTY78: no timer type 0 to destroy 01:07:03: TTY78: no timer type
1 to destroy 01:07:03: TTY78: no timer type 3 to destroy 01:07:03: TTY78: no timer type 4 to
destroy 01:07:03: TTY78: no timer type 2 to destroy 01:07:03: Async78: allowing modem_process to
continue hangup 01:07:03: TTY78: restoring DTR 01:07:05: %LINK-3-UPDOWN: Interface Async78,
changed state to down 01:07:15: As78 DDR: re-enable timeout !--- Callback start. 01:07:15: DDR:
callback triggered by dialer_timers 01:07:15: As78 DDR: beginning callback to alainmod ZDT 6020
01:07:15: As78 DDR: Attempting to dial ZDT 6020 01:07:15: CHAT78: Attempting async line dialer
script 01:07:15: CHAT78: Dialing using Modem script: callback2gsm & System script: none
01:07:15: CHAT78: process started 01:07:15: CHAT78: Asserting DTR 01:07:15: CHAT78: Chat script

```
callback2gsm started 01:07:15: CHAT78: Sending string: AT&F 01:07:15: CHAT78: Expecting string:
OK 01:07:15: CHAT78: Completed match for expect: OK 01:07:15: CHAT78: Sending string: ATS29=8
01:07:15: CHAT78: Expecting string: OK 01:07:15: CHAT78: Completed match for expect: OK !--- The
user entered "ZDT 6020". This is what we send: 01:07:15: CHAT78: Sending string: AT \T<ZDT 6020>
01:07:15: CHAT78: Expecting string: CONNECT 01:07:15: Modem 2/13 Mica: configured for Originate
mode, with Null signaling, 0x1 tone detection. 01:07:15: Modem 2/13 Mica: received dialstring
6020 01:07:15: ISDN Se1/0:15: TX -> SETUP pd = 8 callref = 0x000F 01:07:15: Bearer Capability i
= 0x9090A3 01:07:15: Channel ID i = 0xA9839F 01:07:15: Called Party Number i = 0x81, '6020',
Plan:ISDN, Type:Unknown 01:07:15: ISDN Se1/0:15: RX <- CALL_PROC pd = 8 callref = 0x800F
01:07:15: Channel ID i = 0xA9839F 01:07:15: ISDN Se1/0:15: RX <- ALERTING pd = 8 callref =
0x800F 01:07:15: Modem 2/13 Mica: in modem state CALL_SETUP 01:07:16: Modem 2/13 Mica: Detected
Dial tone 01:07:17: ISDN Se1/0:15: RX <- CONNECT pd = 8 callref = 0x800F 01:07:17: Progress Ind
i = 0x8182 - Destination address is non-ISDN 01:07:17: Connected Number i = 0xA136303230
01:07:17: ISDN Se1/0:15: TX -> CONNECT_ACK pd = 8 callref = 0x000F 01:07:17: Modem 2/13 Mica: in
modem state CONNECT 01:07:19: Modem 2/13 Mica: in modem state LINK 01:07:23: %ISDN-6-CONNECT:
Interface Serial1/0:30 is now connected to 6020 01:07:26: Modem 2/13 Mica: in modem state
TRAINUP 01:07:28: Modem 2/13 Mica: in modem state EC_NEGOTIATING 01:07:28: Modem 2/13 Mica: in
modem state STEADY 01:07:28: CHAT78: Completed match for expect: CONNECT 01:07:28: CHAT78:
Sending string: \c 01:07:28: CHAT78: Chat script callback2gsm finished, status = Success
01:07:28: TTY78: no timer type 1 to destroy 01:07:28: TTY78: no timer type 0 to destroy
01:07:28: Modem 2/13 Mica: CONNECT at 33600/31200 (Tx/Rx), V34+, LAPM, None 01:07:28: As78 PPP:
Treating connection as a callout 01:07:28: Modem 2/13 Mica: PPP escape_map: Tx map = FFFFFFFF,
Rx map = 0 01:07:28: As78 PPP: Authorization required 01:07:28: %LINK-3-UPDOWN: Interface
Async78, changed state to up 01:07:28: As78 DDR: Dialer statechange to up 01:07:28: As78 DDR:
Copying MS callback dialstring ZDT 6020 to ddb 01:07:28: DDR: Freeing callback to alainmod ZDT
6020 01:07:28: As78 DDR: Dialer call has been placed 01:07:29: Modem 2/13 Mica: PPP escape_map:
Tx map = A0000, Rx map = 0 01:07:29: As78 MCB: Initialize 01:07:29: As78 PAP: I AUTH-REQ id 1
len 16 from "alainmod" 01:07:29: As78 PAP: Authenticating peer alainmod 01:07:29: As78 PPP: Sent
PAP LOGIN Request to AAA 01:07:29: As78 PPP: Received LOGIN Response from AAA = PASS 01:07:29:
As78 DDR: Remote name for alainmod 01:07:29: As78 DDR: Authenticated host alainmod with no
matching dialer map 01:07:29: As78 PAP: O AUTH-ACK id 1 len 5 01:07:29: As78 DDR: dialer
protocol up 01:07:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async78, changed state to
up suzanne#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is 172.17.243.1 to network 0.0.0.0
172.17.0.0/24 is subnetted, 1 subnets
C 172.17.243.0 is directly connected, Ethernet0/0
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.31.1.19/32 is directly connected, Async78
C 172.31.0.0/16 is directly connected, Dialer1
S* 0.0.0.0/0 [1/0] via 172.17.243.1
```

```
suzanne#ping 172.31.1.19
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 172.31.1.19, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 356/372/396 ms
```

```
suzanne#
```

```
01:08:08: Modem 2/13 Mica: in modem state TERMINATING
```

```
01:08:08: Modem 2/13 Mica: in modem state IDLE
```

```
01:08:08: Modem 2/13 Mica: DISCONNECT after 00:00:51, due to reason (0x8220)
```

```
EC rcvd DISC frame.
```

```
01:08:08: %ISDN-6-DISCONNECT: Interface Serial1/0:30 disconnected from 6020,
```

```
call lasted 51 seconds
```

```
01:08:08: ISDN Se1/0:15: TX -> DISCONNECT pd = 8 callref = 0x000F
```

```
01:08:08: Cause i = 0x8090 - Normal call clearing
```

01:08:08: ISDN Se1/0:15: RX <- RELEASE pd = 8 callref = 0x800F
01:08:08: ISDN Se1/0:15: TX -> RELEASE_COMP pd = 8 callref = 0x000F
01:08:09: TTY78: DSR was dropped
01:08:09: tty78: Modem: READY->(unknown)
01:08:09: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async78,
changed state to down
01:08:10: TTY78: dropping DTR, hanging up
01:08:10: TTY78: Async Int reset: Dropping DTR
01:08:10: tty78: Modem: HANGUP->(unknown)
01:08:10: Modem 2/13 Mica: PPP escape_map: Tx map = FFFFFFFF, Rx map = 0
01:08:10: As78 PPP: Authorization required
01:08:11: TTY78: cleanup pending. Delaying DTR
01:08:12: %LINK-5-CHANGED: Interface Async78, changed state to reset
01:08:12: TTY78: cleanup pending. Delaying DTR
01:08:13: TTY78: cleanup pending. Delaying DTR
01:08:14: TTY78: cleanup pending. Delaying DTR
01:08:15: TTY78: no timer type 0 to destroy
01:08:15: TTY78: no timer type 1 to destroy
01:08:15: TTY78: no timer type 3 to destroy
01:08:15: TTY78: no timer type 4 to destroy
01:08:15: TTY78: no timer type 2 to destroy
01:08:15: Async78: allowing modem_process to continue hangup
01:08:15: TTY78: restoring DTR
01:08:17: %LINK-3-UPDOWN: Interface Async78, changed state to down
01:08:27: As78 DDR: re-enable timeout

Devolución de llamada de ISDN mediante V.110

!--- Receive call. suzanne# 01:09:00: ISDN Se1/0:15: RX <- SETUP pd = 8 callref = 0x6F28
01:09:00: Sending Complete 01:09:00: Bearer Capability i = 0x8890 01:09:00: Channel ID i =
0xA18388 01:09:00: Calling Party Number i = 0xA1, '6136', Plan:ISDN, Type:National 01:09:00:
Called Party Number i = 0x81, '214', Plan:ISDN, Type:Unknown 01:09:00: %LINK-3-UPDOWN: Interface
Serial1/0:7, changed state to up 01:09:00: ISDN Se1/0:15: TX -> CALL_PROC pd = 8 callref =
0xEF28 01:09:00: Channel ID i = 0xA98388 01:09:00: ISDN Se1/0:15: TX -> CONNECT pd = 8 callref =
0xEF28 01:09:00: Channel ID i = 0xA98388 01:09:00: Se1/0:7 PPP: Treating connection as a callin
01:09:00: Se1/0:7 PPP: Authorization required 01:09:00: ISDN Se1/0:15: RX <- CONNECT_ACK pd = 8
callref = 0x6F28 01:09:00: ISDN Se1/0:15: CALL_PROGRESS: CALL_CONNECTED call id 0x1B, bchan 7,
dsl 0 01:09:01: Se1/0:7 PPP: Authorization required 01:09:01: Se1/0:7 MCB: Initialize 01:09:01:
Se1/0:7 CHAP: O CHALLENGE id 1 len 28 from "suzanne" 01:09:01: Se1/0:7 CHAP: I RESPONSE id 1 len
30 from "alainisdn" 01:09:01: Se1/0:7 PPP: Sent CHAP LOGIN Request to AAA 01:09:01: Se1/0:7 PPP:
Received LOGIN Response from AAA = PASS 01:09:01: Se1/0:7 DDR: Remote name for alainisdn
01:09:01: Se1/0:7 CHAP: O SUCCESS id 1 len 4 01:09:01: Se1/0:7 DDR: PPP callback Callback server
starting to alainisdn 6136 01:09:01: Se1/0:7 DDR: disconnecting call 01:09:01: %ISDN-6-CONNECT:
Interface Serial1/0:7 is now connected to 6136 alainisdn 01:09:01: ISDN Se1/0:15: TX ->
DISCONNECT pd = 8 callref = 0xEF28 01:09:01: Cause i = 0x8090 - Normal call clearing 01:09:01:
ISDN Se1/0:15: RX <- RELEASE pd = 8 callref = 0x6F28 01:09:01: %LINK-3-UPDOWN: Interface
Serial1/0:7, changed state to down 01:09:01: ISDN Se1/0:15: TX -> RELEASE_COMP pd = 8 callref =
0xEF28 01:09:01: Se1/0:7 DDR: disconnecting call 01:09:02: ISDN Se1/0:15: RX <- SETUP pd = 8
callref = 0x70DF 01:09:02: Sending Complete 01:09:02: Bearer Capability i = 0x8890 01:09:02:
Channel ID i = 0xA18389 01:09:02: Calling Party Number i = 0xA1, '6136', Plan:ISDN,
Type:National 01:09:02: Called Party Number i = 0x81, '214', Plan:ISDN, Type:Unknown 01:09:02:
%LINK-3-UPDOWN: Interface Serial1/0:8, changed state to up 01:09:02: ISDN Se1/0:15: TX ->
CALL_PROC pd = 8 callref = 0xF0DF 01:09:02: Channel ID i = 0xA98389 01:09:02: ISDN Se1/0:15: TX
-> CONNECT pd = 8 callref = 0xF0DF 01:09:02: Channel ID i = 0xA98389 01:09:02: Se1/0:8 PPP:
Treating connection as a callin 01:09:02: Se1/0:8 PPP: Authorization required 01:09:02: ISDN
Se1/0:15: RX <- CONNECT_ACK pd = 8 callref = 0x70DF 01:09:02: ISDN Se1/0:15: CALL_PROGRESS:
CALL_CONNECTED call id 0x1C, bchan 8, dsl 0 01:09:02: Se1/0:8 PPP: Authorization required
01:09:03: Se1/0:8 MCB: Initialize 01:09:03: Se1/0:8 CHAP: O CHALLENGE id 1 len 28 from "suzanne"
01:09:03: Se1/0:8 CHAP: I RESPONSE id 1 len 30 from "alainisdn" 01:09:03: Se1/0:8 PPP: Sent CHAP
LOGIN Request to AAA 01:09:03: Se1/0:8 PPP: Received LOGIN Response from AAA = PASS 01:09:03:
Se1/0:8 DDR: Remote name for alainisdn 01:09:03: Se1/0:8 CHAP: O SUCCESS id 1 len 4 01:09:03:
Se1/0:8 DDR: callback to alainisdn already started 01:09:03: Se1/0:8 DDR: disconnecting call

```
01:09:03: %ISDN-6-CONNECT: Interface Serial1/0:8 is now connected to 6136 alainisdn 01:09:03:
ISDN Se1/0:15: TX -> DISCONNECT pd = 8 callref = 0xF0DF 01:09:03: Cause i = 0x8090 - Normal call
clearing 01:09:03: ISDN Se1/0:15: RX <- RELEASE pd = 8 callref = 0x70DF 01:09:03: %LINK-3-
UPDOWN: Interface Serial1/0:8, changed state to down 01:09:03: ISDN Se1/0:15: TX -> RELEASE_COMP
pd = 8 callref = 0xF0DF 01:09:03: Se1/0:8 DDR: disconnecting call !--- Callback Start 01:09:16:
DDR: Callback timer expired 01:09:16: Di1 DDR: beginning callback to alainisdn 6136 01:09:16:
Se1/0:15 DDR: rotor dialout [priority] 01:09:16: Se1/0:15 DDR: Attempting to dial 6136 01:09:16:
ISDN Se1/0:15: TX -> SETUP pd = 8 callref = 0x0010 01:09:16: Bearer Capability i = 0x8890
01:09:16: Channel ID i = 0xA9839F 01:09:16: Called Party Number i = 0x81, '6136', Plan:ISDN,
Type:Unknown 01:09:16: ISDN Se1/0:15: RX <- CALL_PROC pd = 8 callref = 0x8010 01:09:16: Channel
ID i = 0xA9839F 01:09:16: ISDN Se1/0:15: RX <- ALERTING pd = 8 callref = 0x8010 01:09:16: ISDN
Se1/0:15: RX <- CONNECT pd = 8 callref = 0x8010 01:09:16: Connected Number i = 0xA136313336
01:09:16: %LINK-3-UPDOWN: Interface Serial1/0:30, changed state to up 01:09:16: DDR: Freeing
callback to alainisdn 6136 01:09:16: ISDN Se1/0:15: TX -> CONNECT_ACK pd = 8 callref = 0x0010
01:09:16: Se1/0:30 PPP: Treating connection as a callout 01:09:16: Se1/0:30 PPP: Authorization
required 01:09:16: Se1/0:30 MCB: Initialize 01:09:16: Se1/0:30 CHAP: I CHALLENGE id 7 len 30
from "alainisdn" 01:09:16: Se1/0:30 PPP: Sent CHAP SENDAUTH Request to AAA 01:09:16: Se1/0:30
PPP: Received SENDAUTH Response from AAA = PASS 01:09:16: Se1/0:30 CHAP: O RESPONSE id 7 len 28
from "suzanne" 01:09:16: Se1/0:30 CHAP: I SUCCESS id 7 len 4 01:09:16: Se1/0:30 PPP: Sent LCP
AUTHOR Request to AAA 01:09:16: Se1/0:30 PPP: Sent IPCP AUTHOR Request to AAA 01:09:16: Se1/0:30
LCP: Received AAA AUTHOR Response = PASS 01:09:16: Se1/0:30 IPCP: Received AAA AUTHOR Response =
PASS 01:09:16: Se1/0:30 DDR: dialer protocol up 01:09:17: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Serial1/0:30, changed state to up 01:09:22: %ISDN-6-CONNECT: Interface Serial1/0:30 is
now connected to 6136 alainisdn suzanne# suzanne#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
```

```
Gateway of last resort is 172.17.243.1 to network 0.0.0.0
```

```
172.17.0.0/24 is subnetted, 1 subnets
C 172.17.243.0 is directly connected, Ethernet0/0
172.31.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.31.1.2/32 is directly connected, Dialer1
C 172.31.0.0/16 is directly connected, Dialer1
S* 0.0.0.0/0 [1/0] via 172.17.243.1
```

```
suzanne#ping 172.31.1.2
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 172.31.1.2, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/34/36 ms
```

```
suzanne#
```

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- [Página de Soporte de la Tecnología de Marcación y Acceso](#)
- [Soporte Técnico y Documentación - Cisco Systems](#)