

AS5300 Dialing out with ISDN/Async (Outbound DDR)

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Introduction

This configuration has an AS5300 with four Primary Rate Interfaces (PRIs) and support for 96 modem calls or a large number of ISDN calls. It is configured with four PRIs to allow Async and ISDN outbound connections. Static dialer maps are configured on the dialing side for each ISDN/Async connection. Static IP routes are used at both ends of the connection to avoid the unnecessary overhead of a dynamic routing protocol. Adding a remote location would require the addition of a dialer map, username, and a static route for the new destination on the dialing side. All remote nodes have fixed IP addresses.

Before You Begin

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

Step 1 – Configure and verify the Dialout clients are setup correctly.

Dialout Configurations – Device that this AS5300 dials out to:

- PRI: Configuring an Access Server with PRIs for outgoing Async and ISDN calls – Use the central site AS5300 series router (hostname AS5300) configuration provided in the document.
- BRI to receive incoming call from AS5300: Configuring ISDN Dial-on-Demand Routing (DDR) with Dialer Profiles – Use the client site Cisco 2503 router (hostname remoteISDN01) configuration provided in the document.
- Async to receive incoming call from AS5300: Configuring Interface Group-Async with Dialer

Profiles – Use the client site Cisco 2511 router (hostname remoteAsync01) configuration provided in the document

Step 2 – Verify that the Telco circuits are functioning properly. You can use the **show isdn status** command to verify that the BRI or PRI circuit is functioning correctly. Refer to the document Using the **show isdn status** Command for BRI Troubleshooting for more information. You must also enable the T1/E1 PRI circuit for outbound calls. Contact your Telco to verify this information.

Components Used

The information in this document is based on the software and hardware versions below.

- Cisco AS5300, Cisco 2511 and Cisco 2503
- Cisco IOS® Software Release 12.2(10b)
- An external asynchronous modem

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Background Theory

In some situations, it may be necessary to use the T1/E1 PRI circuit for Dialout connections. This helps ensure the client or branch office to which the T1/E1 PRI circuit dials out is a secured identification, instead of an unknown user dialing in with the duplicate username and password to the network.

Related Products

This configuration can be used with any router that has T1 or PRI cards. Hence, any AS5xxx series router with a T1 or PRI card can use this configuration. Cisco 2600 and 3600 series routers can also be configured to dial out ISDN calls with a T1/PRI WAN Interface Card (WIC) or Network Module.

This configuration can also be modified to be used with E1 or PRI ports. Configure the E1 controller with the linecoding, framing and other physical characteristics supplied by the Telco. The D-channel configuration (interface Serial x:15 for E1s) is similar to the one shown here.

Configure

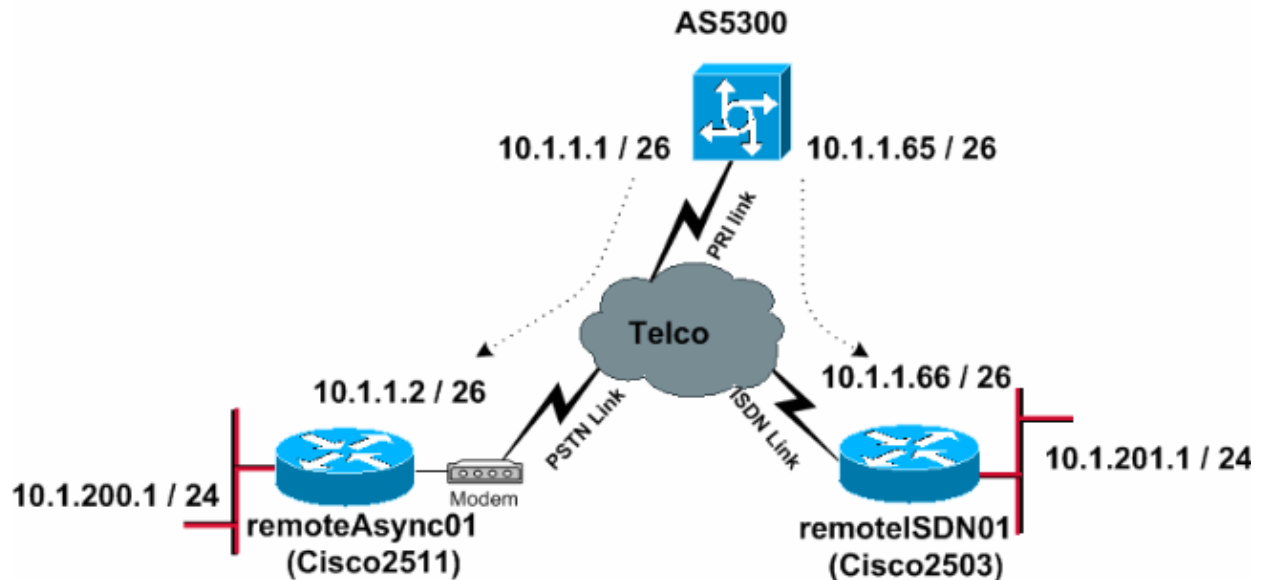
In this section, you are presented with the information to configure the features described in this document. For this network, you need the following:

- The PRI switch type, framing and line coding.
- The user names and passwords of all remote nodes you will be dialing into. Even if you are going to add TACACS+ or RADIUS later, add a few names to the router to test the lines.
- The IP addressing scheme.

Note: To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

Network Diagram

This document uses the network setup shown in the diagram below.



Configurations

This document uses the configurations shown below.

- AS5300
- remoteAsync01
- remoteISDN01

AS5300

```
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname AS5300
!

!
username remoteISDN01 password 0 xxxx
username remoteAsync01 password 0 xxxx

!--- Usernames for local authentication of the call.
!--- The client presents the username/password
!--- and the AS5300 authenticates the peer.
!--- This local database of usernames and passwords are
!--- compared when chap PPP authentication is negotiated
!--- between the AS5300 and remoteISDN01, remoteAsync01 routers.

!
isdn switch-type primary-5ess

!--- Switch-type for this AS5300. Obtain this information from the Telco.

chat-script kelly "" "atdt\T" TIMEOUT 60 CONNECT \c

!--- A chat script is a string of text that defines the handshaking
!--- that occurs between the router and the modem to successfully
!--- handshake with the destination.
!--- In this chat-script, "kelly" is the chat-script name.
!--- The expect string "" is the null from the destination.
!--- And the send string "ATDT\T" is to instruct the modem
```

```
!--- to dial the telephone number in the dialer string command,  
!--- which is 9996200 in the Interface dialer 1  
!--- TIMEOUT 60 CONNECT \C - waits up to 60 seconds for the input string "CONNECT",  
!--- and \C is an escape sequence to end the chat-script.  
!--- Refer to the Modem-Router Connection Guide and Chat-script for more information.  
  
!  
controller T1 0  
  
!--- T1 PRI physical controller configuration.  
  
framing esf  
  
!--- Framing for this T1 is Extended Super Frame (ESF).  
!--- Obtain this information from the Telco.  
  
clock source line primary  
  
!--- T1 0 is the primary clock source for this AS5300.  
!--- Clock source must be specified for the timing  
!--- and synchronization of the T1 carrier.  
  
linecode b8zs  
  
!--- Linecoding for this T1. Obtain this information from the Telco.  
  
pri-group timeslots 1-24  
  
!--- For T1 PRI scenarios, all 24 T1 timeslots are assigned  
!--- as ISDN PRI channels. The router will now automatically create the  
!--- corresponding D-channel: interface Serial 0:23.  
  
!  
controller T1 1  
framing esf  
clock source line secondary 1  
linecode b8zs  
pri-group timeslots 1-24  
!  
controller T1 2  
framing esf  
clock source line secondary  
linecode b8zs  
pri-group timeslots 1-24  
!  
controller T1 3  
framing esf  
clock source line secondary  
linecode b8zs  
pri-group timeslots 1-24  
!  
interface Ethernet0  
ip address 171.68.186.54 255.255.255.240  
no ip directed-broadcast  
!  
interface Serial0:23  
  
!--- D-channel configuration for T1 0.  
  
no ip address  
no ip directed-broadcast  
encapsulation ppp  
dialer rotary-group 2  
  
!--- T1 0 is a member of rotary group 2.
```

```
!--- The rotary group configuration is in interface Dialer2.
!--- This rotary group command enables the Dialin and Dialout for ISDN calls.

isdn switch-type primary-5ess

isdn incoming-voice modem

!--- All incoming ISDN analog modem calls that come in
!--- on an ISDN PRI receive signaling information
!--- from the ISDN D channel. The D channel is used for
!--- circuit-switched data calls and analog modem calls.
!--- This enables all incoming ISDN voice calls to access the call
!--- switch module and integrated modems.
!--- Calls are passed to the modem and the call negotiates the
!--- appropriate connection with the far-end modem.

no cdp enable
!
interface Serial1:23
no ip address
no ip directed-broadcast
encapsulation ppp
dialer rotary-group 2
isdn switch-type primary-5ess
isdn incoming-voice modem
no cdp enable
!
interface Serial2:23
no ip address
no ip directed-broadcast
encapsulation ppp
dialer rotary-group 2
isdn switch-type primary-5ess
isdn incoming-voice modem
no cdp enable
!
interface Serial3:23
no ip address
no ip directed-broadcast
encapsulation ppp
dialer rotary-group 2
isdn switch-type primary-5ess
isdn incoming-voice modem
no cdp enable
!
interface FastEthernet0
no ip address
no ip directed-broadcast
shutdown
!
interface Group-Async1

!--- This interface is configured for Async Dialin and Dialout in the T1 PRI.
!--- Without this interface, Async calls cannot be made.

no ip address
no ip directed-broadcast
async mode interactive

dialer in-band

dialer rotary-group 1

!--- Group-Async 1 is a member of the rotary group.
```

```

!--- The rotary group configuration is in interface Dialer 1.

no cdp enable

group-range 1 96

!--- Group-range indicates the asynchronous interfaces
!--- which come under the Group-Async interface.

!
interface Dialer1
 ip address 10.1.1.1 255.255.255.192
 no ip directed-broadcast
 encapsulation ppp
 dialer in-band

 dialer idle-timeout 600

!--- Set an idle-timeout to hold the ISDN line.
!--- Idle timeout for outgoing calls is 600 seconds (10 minutes).
!--- If the ISDN link is idle for more than 600 seconds, it will be dropped.

 dialer map ip 10.1.1.2 name remoteAsync01 modem-script kelly broadcast 9996200

!--- Dialer map statements for the remote router remoteAsync01.
!--- The name must match the one used by the remote router to identify itself.
!--- Use the modem chat script "kelly" for this connection.

 dialer-group 1

!--- Apply interesting traffic definition from the dialer-list 1.

ppp authentication chap
!
interface Dialer2

!--- The dialer rotary-group 2 command in Int s0:23 activates the interface
!--- Dialer2 for inbound and outbound ISDN calls.

 ip address 10.1.1.65 255.255.255.192
 no ip directed-broadcast
 encapsulation ppp
 dialer in-band
 dialer idle-timeout 600
 dialer map ip 10.1.1.66 name remoteISDN01 broadcast 9996100
 dialer-group 1
 ppp authentication chap
!
no ip http server
ip classless

ip route 10.1.200.0 255.255.255.0 10.1.1.2

!--- Static route for the 10.1.200.0/24 network.
!--- Interesting Traffic for that network
!--- will be sent to interface Dialer1 and the router
!--- will initiate the outbound call for Asynchronous connectivity.

ip route 10.1.201.0 255.255.255.0 10.1.1.66

!--- Static route for the 10.1.201.0/24 network.
!--- Interesting traffic for that network
!--- will be sent to interface Dialer2 and the router
!--- will initiate the outbound call for ISDN BRI connectivity.

!

```

```

dialer-list 1 protocol ip permit

!--- Interesting traffic is defined by the Protocol IP.
!--- This is applied to interface Dialer1 and Dialer2 using the dialer-group 1 command.
!--- The specified dialer-list number must be the same
!--- as the dialer-group number; in this example, defined to be "1."

!
line con 0
  transport input none
line 1 96

script dialer kelly

!--- Enables the chat script kelly configured globally.

modem InOut
transport preferred none
transport output none
line aux 0
line vty 0 4
  login
!
end

```

remoteAsync01

```

!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname remoteAsync01
!

!
username AS5300 password 0 xxxx

!
modemcap entry default

!--- A modemcap named "default" will be applied
!--- to lines one through eight of Async interfaces.

!
interface Ethernet0
  ip address 10.1.200.1 255.255.255.0
  no ip directed-broadcast
!
interface Serial0
  no ip address
  no ip directed-broadcast
  shutdown
!
interface Serial1
  no ip address
  no ip directed-broadcast
  shutdown
!
interface Async1
  ip address 10.1.1.2 255.255.255.192
  no ip directed-broadcast
  encapsulation ppp
  dialer idle-timeout 600
  async mode interactive

```

```

!--- Enables the slip and ppp EXEC commands.

ppp authentication chap
!
no ip http server
ip classless

ip route 0.0.0.0 0.0.0.0 10.1.1.1

!--- Default static route for the outgoing packets.

!
line con 0
  transport input none
line 1 8
  login local
  modem InOut
  modem autoconfigure type default

!--- Apply the modemcap "default" (configured globally) to initialize the modem.
!--- Refer to the Modem-Router Connection Guide for more information.

  transport input all
  autoselect during-login autoselect ppp
  speed 38400
  flowcontrol hardware
line aux 0
line vty 0 4
!
end

```

remoteISDN01

```

!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname remoteISDN01
!
!
username AS5300 password 0 xxxx

!--- Usernames for local authentication of the call.
!--- The client presents the username/password
!--- and the AS5300 authenticates the peer.
!--- This local database of usernames and passwords are
!--- compared when chap PPP authentication is negotiated
!--- between the AS5300 and remoteISDN01 routers.

!
isdn switch-type basic-5ess

!--- Switch-type for this 2503. Obtain this information from the Telco.
.
!
interface Ethernet0
  ip address 10.1.201.1 255.255.255.0
  no ip directed-broadcast
!
interface Serial0
  no ip address
  no ip directed-broadcast

```

```

shutdown
!
interface Serial1
no ip address
no ip directed-broadcast
shutdown
!
interface BRI0
ip address 10.1.1.66 255.255.255.192
no ip directed-broadcast
encapsulation ppp
dialer idle-timeout 600
dialer-group 1
isdn switch-type basic-5ess
ppp authentication chap
!
no ip http server
ip classless

ip route 0.0.0.0 0.0.0.0 10.1.1.65

!--- Default static route for the outgoing packets.

!
dialer-list 1 protocol ip permit
!
line con 0
transport input none
line aux 0
line vty 0 4
!
end

```

Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

- **show isdn status** – Ensures that the router is properly communicating with the ISDN switch. In the output, verify that Layer 1 Status is ACTIVE, and that the Layer 2 Status state = MULTIPLE_FRAME_ESTABLISHED appears. This command also displays the number of active calls.
- **show ppp multilink** – Displays information on multilink bundles that are active. This command should be used to verify the multilink connection.
- **show dialer [interface type number]**– Displays general diagnostic information for interfaces configured for DDR. If the dialer came up properly, the Dialer state is data link layer up message should appear. If physical layer up appears, then the line protocol came up, but the Network Control Protocol (NCP) did not. The source and destination addresses of the packet that initiated the dialing are shown in the Dial reason line. This show command also displays the timer's configuration and the time before the connection times out.
- **show caller user username detail** – Shows parameters for the particular user such as the IP address assigned, PPP and PPP bundle parameters, and so on. If your version of Cisco IOS software does not support this command, use the show user command.
- **show dialer map** – Displays configured dynamic and static dialer maps. This command can be used to see if a dynamic dialer map was created. Without a dialer map, you cannot route packets.
- **show isdn service** – To check the status of the B channels. (This command is only for access servers that support PRI/T1 controllers.)

- **show user** – To display async/sync users currently connected.

Below are some show command outputs for successful calls. Pay attention to the bolded sections and the comments provided in the outputs. Compare the output that you obtain with the result shown below.

The following output is obtained before establishing the connection with remoteISDN01 and remoteAsync01 routers.

```
AS5300#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 not set

    171.68.0.0/28 is subnetted, 1 subnets
C       171.68.186.48 is directly connected, Ethernet0
    10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C       10.1.1.0/26 is directly connected, Dialer1
C       10.1.1.64/26 is directly connected, Dialer2
S       10.1.201.0/24 [1/0] via 10.1.1.66
S       10.1.200.0/24 [1/0] via 10.1.1.2
```

The following output is obtained after establishing the connection with remoteISDN01 and remoteAsync01 routers.

```
AS5300#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 not set

    171.68.0.0/28 is subnetted, 1 subnets
C       171.68.186.48 is directly connected, Ethernet0
    10.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
C       10.1.1.2/32 is directly connected, Dialer1
C       10.1.1.0/26 is directly connected, Dialer1
C       10.1.1.66/32 is directly connected, Dialer2
C       10.1.1.64/26 is directly connected, Dialer2
S       10.1.201.0/24 [1/0] via 10.1.1.66
S       10.1.200.0/24 [1/0] via 10.1.1.2
```

```
AS5300#show ip route connected
    171.68.0.0/28 is subnetted, 1 subnets
C       171.68.186.48 is directly connected, Ethernet0
    10.0.0.0/8 is variably subnetted, 6 subnets, 3 masks
C       10.1.1.2/32 is directly connected, Dialer1
C       10.1.1.0/26 is directly connected, Dialer1
C       10.1.1.66/32 is directly connected, Dialer2
C       10.1.1.64/26 is directly connected, Dialer2
```

```
AS5300#show controllers t1 0
T1 0 is up.
```

Applique type is Channelized T1
Cablelength is long gain36 0db
No alarms detected.
alarm-trigger is not set
Version info of slot 0: HW: 4, PLD Rev: 0

Manufacture Cookie Info:

EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x42,
Board Hardware Version 1.32, Item Number 800-2540-02,
Board Revision A0, Serial Number 11493161,
PLD/ISP Version 0.0, Manufacture Date 12-Dec-1998.

Framing is ESF, Line Code is B8ZS, Clock Source is Line Primary.

Data in current interval (197 seconds elapsed):
0 Line Code Violations, 0 Path Code Violations
0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs

!--- Output suppressed.

AS5300#show int s0:23

Serial0:23 is up, line protocol is up (spoofing)
Hardware is DSX1
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation PPP, loopback not set
DTR is pulsed for 1 seconds on reset
Last input 00:00:06, output 00:00:06, output hang never
Last clearing of "show interface" counters 11:43:21
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: weighted fair
Output queue: 0/1000/64/0 (size/max total/threshold/drops)
Conversations 0/1/16 (active/max active/max total)
Reserved Conversations 0/0 (allocated/max allocated)
Available Bandwidth 48 kilobits/sec
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
5075 packets input, 25767 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
2 input errors, 0 CRC, 1 frame, 0 overrun, 0 ignored, 1 abort
5073 packets output, 25904 bytes, 0 underruns
0 output errors, 0 collisions, 13 interface resets
0 output buffer failures, 0 output buffers swapped out
2 carrier transitions
Timeslot(s) Used:24, Transmitter delay is 0 flags

AS5300#show users

Line	User	Host(s)	Idle	Location
* 0 con 0		idle	00:00:00	
11 tty 11	remoteAsyn	Async interface	00:05:40	PPP: 10.1.1.2

Interface	User	Mode	Idle	Peer Address
Se0:21	remoteISDN	Sync PPP	00:06:12	PPP: 10.1.1.66

remoteAsync01#show users

Line	User	Host(s)	Idle	Location
* 0 con 0		idle	00:00:00	
1 tty 1	AS5300	Async interface	00:07:27	PPP: 10.1.1.1
2 tty 2		Modem Autoconfigure	00:00:00	
3 tty 3		Modem Autoconfigure	00:00:00	
4 tty 4		Modem Autoconfigure	00:00:01	
5 tty 5		Modem Autoconfigure	00:00:00	
6 tty 6		Modem Autoconfigure	00:00:00	
7 tty 7		Modem Autoconfigure	00:00:00	

```

Interface      User      Mode      Idle      Peer Address

remoteISDN01#show users
  Line      User      Host(s)      Idle      Location
* 0 con 0      idle      00:00:00
  Interface      User      Mode      Idle      Peer Address
  BR0:1      AS5300      Sync PPP      00:09:09      PPP: 10.1.1.65

```

AS5300#show isdn history

```

-----
                          ISDN CALL HISTORY
-----
Call History contains all active calls, and a maximum of 100 inactive calls.
Inactive call data will be retained for a maximum of 15 minutes.

-----
Call      Calling      Called      Remote      Seconds      Seconds      Seconds      Charges
Type      Number      Number      Name      Used      Left      Idle      Units/Currency
-----
Out      ---N/A---      9996200      +oteAsync01      187
Out      ---N/A---      9996200      +oteAsync01      56
Out      ---N/A---      9996200      +oteAsync01      469      305      294      0
Out      ---N/A---      9996100      +moteISDN01      105      509      90      0
-----

```

AS5300#show isdn active

```

-----
                          ISDN ACTIVE CALLS
-----
Call      Calling      Called      Remote      Seconds      Seconds      Seconds      Charges
Type      Number      Number      Name      Used      Left      Idle      Units/Currency
-----
Out      ---N/A---      9996100      +moteISDN01      152      449      150      0
Out      ---N/A---      9996200      +oteAsync01      133      491      108      0
-----

```

AS5300#show isdn status

```

Global ISDN Switchtype = primary-5ess
ISDN Serial0:23 interface
  dsl 0, interface ISDN Switchtype = primary-5ess
  Layer 1 Status:
    ACTIVE
  Layer 2 Status:
    TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
  Layer 3 Status:
    2 Active Layer 3 Call(s)
    CCB:callid=809E, sapi=0, ces=0, B-chan=23, calltype=VOICE
    CCB:callid=809F, sapi=0, ces=0, B-chan=22, calltype=DATA
  Active dsl 0 CCBs = 2
  The Free Channel Mask: 0x801FFFFFF
  Number of L2 Discards = 1, L2 Session ID = 10

```

!--- Output suppressed.

AS5300#Ping 10.1.201.1

```

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.201.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/33/36 ms

```

AS5300#PING 10.1.200.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.200.1, timeout is 2 seconds:
 !!!!!
 Success rate is 100 percent (5/5), round-trip min/avg/max = 128/141/148 ms

```
AS5300#show isdn service
PRI Channel Statistics:
ISDN Se0:23, Channel [1-24]
Configured Isdn Interface (dsl) 0
Channel State (0=Idle 1=Proposed 2=Busy 3=Reserved 4=Restart 5=Maint_Pend)
Channel : 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4
State   : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 2 3
Service State (0=Inservice 1=Maint 2=Outofservice)
Channel : 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4
State   : 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2
```

!--- Output suppressed.

```
AS5300#show modem
Codes:
* - Modem has an active call
C - Call in setup
T - Back-to-Back test in progress
R - Modem is being Reset
p - Download request is pending and modem cannot be used for taking calls
D - Download in progress
B - Modem is marked bad and cannot be used for taking calls
b - Modem is either busied out or shut-down
d - DSP software download is required for achieving K56flex connections
! - Upgrade request is pending
```

Mdm	Avg Hold Time	Inc calls Succ	Inc calls Fail	Out calls Succ	Out calls Fail	Busied Out	Failed Dial	No Answer	Succ Pct.
1/0	00:00:00	0	0	0	0	0	0	0	0%
1/1	00:00:00	0	0	0	0	0	0	0	0%
1/2	00:00:00	0	0	0	0	0	0	0	0%
1/3	00:00:00	0	0	0	0	0	0	0	0%
1/4	00:00:00	0	0	0	0	0	0	0	0%
1/5	00:00:00	0	0	0	0	0	0	0	0%
1/6	00:00:00	0	0	0	0	0	0	0	0%
1/7	00:00:00	0	0	0	0	0	0	0	0%
1/8	00:00:00	0	0	0	0	0	0	0	0%
1/9	00:00:00	0	0	0	0	0	0	0	0%
* 1/10	00:02:21	0	0	5	5	0	0	0	50%
1/11	00:03:11	0	0	23	6	0	0	0	79%
1/12	00:00:00	0	0	0	0	0	0	0	0%
1/13	00:00:00	0	0	0	0	0	0	0	0%
1/14	00:00:00	0	0	0	0	0	0	0	0%

!--- Output suppressed.

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

Troubleshooting Resources

- Incoming ISDN Call Troubleshooting – for ISDN call failure troubleshooting.
- PRI ISDN Callin – additional information on troubleshooting ISDN call failures
- T1 Troubleshooting Flowchart – Use this flowchart if you suspect that the T1 circuit is not working properly.
- T1 PRI Troubleshooting – Troubleshooting procedure for ISDN PRI circuits

- Loopback Tests for T1/56K Lines – to verify that the T1 port on the router is functioning correctly.
- Using the **show isdn status** Command for BRI Troubleshooting – Use this document for BRI troubleshooting.
- Troubleshooting ISDN BRI Layer 3 using the **debug isdn q931** Command – Use this document for ISDN Layer 3 troubleshooting.

Troubleshooting Commands

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.

Note: Before issuing **debug** commands, please see Important Information on Debug Commands.

- **debug dialer** – When DDR is enabled on the interface, this command displays information concerning the cause of any call (called the Dialing cause).
- **debug isdn q931** – To check ISDN connections as outbound calls are initiated.
- **debug ppp negotiation** – To see if a client is passing PPP negotiation. A high number of concurrent PPP negotiations can overwhelm the router CPU.
- **debug ppp authentication** – To see if a client is passing authentication. If you are using a version prior to Cisco IOS release 11.2, use the debug ppp chap command instead.
- **debug ppp error** – To display protocol errors and error statistics associated with PPP connection negotiation and operation.

Modem Troubleshooting Commands

- **debug chat** – To see the execution of the chat script when a call is initiated.
- **debug modem** – To see if the router is receiving the right signals from the modem.
- **debug modem csm** – To enable the modem management Call Switching Module (CSM) debug mode.

Troubleshooting Output

Below is the debug outputs for a successful outgoing call. Pay attention to the bolded sections and the comments provided in the outputs. Compare the output that you obtain with the result shown below.

Debugging Dialout Connection from AS5300 T1 PRI to remoteAsync01 Router

```
AS5300#debug isdn q931
ISDN Q931 packets debugging is on
AS5300#debug chat
Chat scripts activity debugging is on
AS5300#debug dialer events
Dial on demand events debugging is on
AS5300#show debug
Dial on demand:
  Dial on demand events debugging is on
PPP:
  PPP protocol negotiation debugging is on
ISDN:
  ISDN Q931 packets debugging is on
  ISDN Q931 packets debug DSLs. (On/Off/No DSL:1/0/-)
  DSL  0 --> 7
  1 1 1 1 - - - -

Chat Scripts:
Chat scripts activity debugging is on
```

AS5300#ping 10.1.200.1

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.200.1, timeout is 2 seconds:

Dec 30 17:59:16.675: As12 DDR: rotor dialout [priority]

Dec 30 17:59:16.675: **As12 DDR: Dialing cause ip (s=10.1.1.1, d=10.1.200.1)**

!--- The dialing cause is a ping for 10.1.200.1.

!--- ICMP is tagged as interesting.

Dec 30 17:59:16.675: As12 DDR: Attempting to dial 9996200

Dec 30 17:59:16.675: CHAT12: Attempting async line dialer script

Dec 30 17:59:16.675: CHAT12: Dialing using Modem script: **kelly**

& System script: none

!--- Uses the Chat script kelly to Dialout.

Dec 30 17:59:16.675: CHAT12: process started

Dec 30 17:59:16.675: CHAT12: Asserting DTR

Dec 30 17:59:16.675: CHAT12: Chat script kelly started

Dec 30 17:59:16.675: **CHAT12: Sending string: atdt\T<9996200>**

!--- The Chat script kelly uses the Telephone no in Interface Dialer 1 to Dialout.

Dec 30 17:59:16.675: CHAT12: Expecting string: CONNECT

Dec 30 17:59:16.755: ISDN Se0:23: **TX -> SETUP pd = 8 callref = 0x00B1**

!--- Outgoing ISDN Q.931 SETUP message.

Dec 30 17:59:16.755: Bearer Capability i = 0x8090A2

Dec 30 17:59:16.755: Channel ID i = 0xA98397

Dec 30 17:59:16.759: Called Party Number i = 0xA1, '9996200', Plan:ISDN,
Type:National

Dec 30 17:59:16.823: ISDN Se0:23: RX <- CALL_PROC pd = 8 callref = 0x80B1

Dec 30 17:59:16.823: Channel ID i = 0xA98397

Dec 30 17:59:17.023: ISDN Se0:23: RX <- ALERTING pd = 8 callref = 0x80B1.....

Success rate is 0 percent (0/5)

AS5300#

Dec 30 17:59:26.115: ISDN Se0:23: **RX <- CONNECT pd = 8 callref = 0x80B1**

!--- Received Q.931 CONNECT message.

Dec 30 17:59:26.119: ISDN Se0:23: TX -> CONNECT_ACK pd = 8 callref = 0x00B1

Dec 30 17:59:32.119: %ISDN-6-CONNECT: Interface Serial0:22 is now connected to
9996200

Dec 30 17:59:49.347: CHAT12: Completed match for expect: CONNECT

Dec 30 17:59:49.347: CHAT12: Sending string: \c

Dec 30 17:59:49.347: CHAT12: Chat script kelly finished, status = Success

Dec 30 17:59:49.351: **Dil IPCP: Install route to 10.1.1.2**

!--- A route to the peer is installed.

Dec 30 17:59:51.351: **%LINK-3-UPDOWN: Interface Async12, changed state to up**

Dec 30 17:59:51.351: As12 DDR: Dialer statechange to up

Dec 30 17:59:51.351: As12 DDR: Dialer call has been placed

Dec 30 17:59:51.351: As12 PPP: Treating connection as a callout

Dec 30 17:59:51.351: As12 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]

Dec 30 17:59:51.351: As12 LCP: O CONFREQ [Closed] id 149 len 25

Dec 30 17:59:51.351: As12 LCP: ACCM 0x000A0000 (0x0206000A0000)

Dec 30 17:59:51.351: As12 LCP: AuthProto CHAP (0x0305C22305)

Dec 30 17:59:51.351: As12 LCP: MagicNumber 0x4A997A3A (0x05064A997A3A)

Dec 30 17:59:51.351: As12 LCP: PFC (0x0702)

Dec 30 17:59:51.351: As12 LCP: ACFC (0x0802)

```
Dec 30 17:59:53.351: As12 LCP: TIMEOUT: State REQsent
Dec 30 17:59:53.351: As12 LCP: O CONFREQ [REQsent] id 150 len 25
Dec 30 17:59:53.351: As12 LCP: ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:59:53.351: As12 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 17:59:53.351: As12 LCP: MagicNumber 0x4A997A3A (0x05064A997A3A)
Dec 30 17:59:53.351: As12 LCP: PFC (0x0702)
Dec 30 17:59:53.351: As12 LCP: ACFC (0x0802)
Dec 30 17:59:53.511: As12 LCP: I CONFREQ [REQsent] id 53 len 25
Dec 30 17:59:53.511: As12 LCP: ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:59:53.511: As12 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 17:59:53.511: As12 LCP: MagicNumber 0x67B12AE8 (0x050667B12AE8)
Dec 30 17:59:53.511: As12 LCP: PFC (0x0702)
Dec 30 17:59:53.511: As12 LCP: ACFC (0x0802)
Dec 30 17:59:53.511: As12 LCP: O CONFACK [REQsent] id 53 len 25
Dec 30 17:59:53.511: As12 LCP: ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:59:53.511: As12 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 17:59:53.511: As12 LCP: MagicNumber 0x67B12AE8 (0x050667B12AE8)
Dec 30 17:59:53.511: As12 LCP: PFC (0x0702)
Dec 30 17:59:53.511: As12 LCP: ACFC (0x0802)
Dec 30 17:59:53.543: As12 LCP: I CONFACK [ACKsent] id 150 len 25
Dec 30 17:59:53.543: As12 LCP: ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:59:53.543: As12 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 17:59:53.543: As12 LCP: MagicNumber 0x4A997A3A (0x05064A997A3A)
Dec 30 17:59:53.543: As12 LCP: PFC (0x0702)
Dec 30 17:59:53.543: As12 LCP: ACFC (0x0802)
Dec 30 17:59:53.543: As12 LCP: State is Open
```

!--- LCP negotiation is complete.

```
Dec 30 17:59:53.543: As12 PPP: Phase is AUTHENTICATING, by both [0 sess, 1 load]
Dec 30 17:59:53.543: As12 CHAP: O CHALLENGE id 25 len 27 from "AS5300"
Dec 30 17:59:53.655: As12 CHAP: I CHALLENGE id 27 len 34 from "remoteAsync01"
Dec 30 17:59:53.655: As12 CHAP: O RESPONSE id 27 len 27 from "AS5300"
Dec 30 17:59:53.671: As12 CHAP: I RESPONSE id 25 len 34 from "remoteAsync01"
Dec 30 17:59:53.671: As12 CHAP: O SUCCESS id 25 len 4
Dec 30 17:59:53.783: As12 CHAP: I SUCCESS id 27 len 4
```

!--- Two-way CHAP authentication is successful.

```
Dec 30 17:59:53.783: As12 PPP: Phase is UP [0 sess, 1 load]
Dec 30 17:59:53.783: As12 IPCP: O CONFREQ [Closed] id 25 len 10
Dec 30 17:59:53.783: As12 IPCP: Address 10.1.1.1 (0x03060A010101)
Dec 30 17:59:53.783: As12 CDPCP: O CONFREQ [Closed] id 25 len 4
Dec 30 17:59:53.783: As12 IPCP: I CONFREQ [REQsent] id 27 len 10
Dec 30 17:59:53.783: As12 IPCP: Address 10.1.1.2 (0x03060A010102)
Dec 30 17:59:53.783: As12 IPCP: O CONFACK [REQsent] id 27 len 10
Dec 30 17:59:53.783: As12 IPCP: Address 10.1.1.2 (0x03060A010102)
Dec 30 17:59:53.911: As12 IPCP: I CONFACK [ACKsent] id 25 len 10
Dec 30 17:59:53.911: As12 IPCP: Address 10.1.1.1 (0x03060A010101)
Dec 30 17:59:53.911: As12 IPCP: State is Open
Dec 30 17:59:53.911: As12 DDR: dialer protocol up
Dec 30 17:59:53.927: As12 LCP: I PROTREJ [Open] id 54 len 10 protocol CDPCP
(0x820701190004)
Dec 30 17:59:53.927: As12 CDPCP: State is Closed
Dec 30 17:59:54.783: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async12,
changed state to up
Dec 30 17:59:54.783: As12 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 17:59:54.783: As12 CDPCP: State is Closed
Dec 30 17:59:54.783: As12 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 17:59:54.783: As12 CDPCP: State is Closed
Dec 30 17:59:54.783: As12 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 17:59:54.783: As12 CDPCP: State is Closed
Dec 30 17:59:54.787: As12 CDPCP: TIMEOUT: State Closed
```

Dec 30 17:59:54.787: As12 CDPCP: State is Listen

remoteAsync01#**debug ppp negotiation**

PPP protocol negotiation debugging is on

remoteAsync01#

```
Dec 30 17:58:54: As1 LCP: I CONFREQ [Closed] id 150 len 25
Dec 30 17:58:54: As1 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:58:54: As1 LCP:   AuthProto CHAP (0x0305C22305)
Dec 30 17:58:54: As1 LCP:   MagicNumber 0x4A997A3A (0x05064A997A3A)
Dec 30 17:58:54: As1 LCP:   PFC (0x0702)
Dec 30 17:58:54: As1 LCP:   ACFC (0x0802)
Dec 30 17:58:54: As1 LCP: Lower layer not up, Fast Starting
Dec 30 17:58:54: As1 PPP: Treating connection as a dedicated line
Dec 30 17:58:54: As1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
Dec 30 17:58:54: As1 LCP: O CONFREQ [Closed] id 53 len 25
Dec 30 17:58:54: As1 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:58:54: As1 LCP:   AuthProto CHAP (0x0305C22305)
Dec 30 17:58:54: As1 LCP:   MagicNumber 0x67B12AE8 (0x050667B12AE8)
Dec 30 17:58:54: As1 LCP:   PFC (0x0702)
Dec 30 17:58:54: As1 LCP:   ACFC (0x0802)
Dec 30 17:58:54: As1 LCP: O CONFACK [REQsent] id 150 len 25
Dec 30 17:58:54: As1 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:58:54: As1 LCP:   AuthProto CHAP (0x0305C22305)
Dec 30 17:58:54: As1 LCP:   MagicNumber 0x4A997A3A (0x05064A997A3A)
Dec 30 17:58:54: As1 LCP:   PFC (0x0702)
Dec 30 17:58:54: As1 LCP:   ACFC (0x0802)
Dec 30 17:58:54: %LINK-3-UPDOWN: Interface Async1, changed state to up
Dec 30 17:58:55: As1 LCP: I CONFACK [ACKsent] id 53 len 25
Dec 30 17:58:55: As1 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Dec 30 17:58:55: As1 LCP:   AuthProto CHAP (0x0305C22305)
Dec 30 17:58:55: As1 LCP:   MagicNumber 0x67B12AE8 (0x050667B12AE8)
Dec 30 17:58:55: As1 LCP:   PFC (0x0702)
Dec 30 17:58:55: As1 LCP:   ACFC (0x0802)
Dec 30 17:58:55: As1 LCP: State is Open
```

!--- LCP negotiation is complete.

```
Dec 30 17:58:55: As1 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Dec 30 17:58:55: As1 CHAP: O CHALLENGE id 27 len 34 from "remoteAsync01"
Dec 30 17:58:55: As1 CHAP: I CHALLENGE id 25 len 27 from "AS5300"
Dec 30 17:58:55: As1 CHAP: O RESPONSE id 25 len 34 from "remoteAsync01"
Dec 30 17:58:55: As1 CHAP: I RESPONSE id 27 len 27 from "AS5300"
Dec 30 17:58:55: As1 CHAP: I SUCCESS id 25 len 4
Dec 30 17:58:55: As1 CHAP: O SUCCESS id 27 len 4
```

!--- Two-way CHAP authentication is successful.

```
Dec 30 17:58:55: As1 PPP: Phase is UP [0 sess, 1 load]
Dec 30 17:58:55: As1 IPCP: O CONFREQ [Closed] id 27 len 10
Dec 30 17:58:55: As1 IPCP:   Address 10.1.1.2 (0x03060A010102)
Dec 30 17:58:55: As1 IPCP: I CONFREQ [REQsent] id 25 len 10
Dec 30 17:58:55: As1 IPCP:   Address 10.1.1.1 (0x03060A010101)
Dec 30 17:58:55: As1 IPCP: O CONFACK [REQsent] id 25 len 10
Dec 30 17:58:55: As1 IPCP:   Address 10.1.1.1 (0x03060A010101)
Dec 30 17:58:55: As1 CDPCP: I CONFREQ [Not negotiated] id 25 len 4
Dec 30 17:58:55: As1 LCP: O PROTREJ [Open] id 54 len 10 protocol CDPCP
(0x820701190004)
Dec 30 17:58:55: As1 IPCP: I CONFACK [ACKsent] id 27 len 10
Dec 30 17:58:55: As1 IPCP:   Address 10.1.1.2 (0x03060A010102)
Dec 30 17:58:55: As1 IPCP: State is Open
Dec 30 17:58:55: As1 IPCP: Install route to 10.1.1.1
```

!--- A route to the peer is installed.

Dec 30 17:58:56: %LINEPROTO-5-UPDOWN: **Line protocol on Interface Async1, changedstate to up**

Debugging Dialout from AS5300 to remoteISDN01 Router

AS5300#**show debug**

Dial on demand:

Dial on demand events debugging is on

PPP:

PPP protocol negotiation debugging is on

ISDN:

ISDN Q931 packets debugging is on

ISDN Q931 packets debug DSLs. (On/Off/No DSL:1/0/-)

DSL 0 --> 7

1 1 1 1 - - - -

Chat Scripts:

Chat scripts activity debugging is on

AS5300#**ping 10.1.201.1**

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 10.1.201.1, timeout is 2 seconds:

Dec 30 18:12:42.811: Se0:23 DDR: rotor dialout [priority]

Dec 30 18:12:42.815: **Se0:23 DDR: Dialing cause ip (s=10.1.1.65, d=10.1.201.1)**

!--- The dialing cause is a ping for 10.1.201.1.

!--- ICMP is tagged as interesting.

Dec 30 18:12:42.815: Se0:23 DDR: Attempting to dial 9996100

Dec 30 18:12:42.815: **ISDN Se0:23: TX ->SETUP pd = 8 callref = 0x00B2**

!--- Outgoing ISDN Q.931 SETUP message.

Dec 30 18:12:42.815: Bearer Capability i = 0x8890

Dec 30 18:12:42.815: Channel ID i = 0xA98396

Dec 30 18:12:42.819: Called Party Number i = 0xA1, '9996100', Plan:ISDN, Type:National

Dec 30 18:12:42.867: ISDN Se0:23: RX <- CALL_PROC pd = 8 callref = 0x80B2

Dec 30 18:12:42.867: Channel ID i = 0xA98396

Dec 30 18:12:43.127: ISDN Se0:23: RX <- CONNECT pd = 8 callref = 0x80B2

!--- Received Q.931 CONNECT message.

Dec 30 18:12:43.135: %LINK-3-UPDOWN: Interface Serial0:21, changed state to up

Dec 30 18:12:43.135: Se0:21 PPP: Treating connection as a callout

Dec 30 18:12:43.135: Se0:21 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]

Dec 30 18:12:43.135: Se0:21 LCP: O CONFREQ [Closed] id 25 len 15

Dec 30 18:12:43.139: Se0:21 LCP: AuthProto CHAP (0x0305C22305)

Dec 30 18:12:43.139: Se0:21 LCP: MagicNumber 0x4AA54104 (0x05064AA54104)

Dec 30 18:12:43.139: ISDN Se0:23: TX -> CONNECT_ACK pd = 8 callref = 0x00B2

Dec 30 18:12:43.167: Se0:21 LCP: I CONFREQ [REQsent] id 55 len 15

Dec 30 18:12:43.167: Se0:21 LCP: AuthProto CHAP (0x0305C22305)

Dec 30 18:12:43.167: Se0:21 LCP: MagicNumber 0x575DC27D (0x0506575DC27D)

Dec 30 18:12:43.167: Se0:21 LCP: O CONFACK [REQsent] id 55 len 15

Dec 30 18:12:43.167: Se0:21 LCP: AuthProto CHAP (0x0305C22305)

Dec 30 18:12:43.167: Se0:21 LCP: MagicNumber 0x575DC27D (0x0506575DC27D)

Dec 30 18:12:43.175: Se0:21 LCP: I CONFACK [ACKsent] id 25 len 15

Dec 30 18:12:43.175: Se0:21 LCP: AuthProto CHAP (0x0305C22305)

Dec 30 18:12:43.175: Se0:21 LCP: MagicNumber 0x4AA54104 (0x05064AA54104)

Dec 30 18:12:43.179: Se0:21 **LCP: State is Open**

!--- LCP negotiation is complete.

```
Dec 30 18:12:43.179: Se0:21 PPP: Phase is AUTHENTICATING, by both [0 sess, 1!!!!  
Success rate is 80 percent (4/5), round-trip min/avg/max = 32/33/36 msAS5300# load]  
Dec 30 18:12:43.179: Se0:21 CHAP: O CHALLENGE id 13 len 27 from "AS5300"  
Dec 30 18:12:43.227: Se0:21 CHAP: I CHALLENGE id 36 len 33 from "remoteISDN01"  
Dec 30 18:12:43.227: Se0:21 CHAP: O RESPONSE id 36 len 27 from "AS5300"  
Dec 30 18:12:43.251: Se0:21 CHAP: I SUCCESS id 36 len 4  
Dec 30 18:12:43.263: Se0:21 CHAP: I RESPONSE id 13 len 33 from "remoteISDN01"  
Dec 30 18:12:43.263: Se0:21 CHAP: O SUCCESS id 13 len 4
```

!--- Two-way CHAP authentication is successful.

```
Dec 30 18:12:43.263: Se0:21 PPP: Phase is UP [0 sess, 1 load]  
Dec 30 18:12:43.263: Se0:21 IPCP: O CONFREQ [Closed] id 13 len 10  
Dec 30 18:12:43.267: Se0:21 IPCP: Address 10.1.1.65 (0x03060A010141)  
Dec 30 18:12:43.287: Se0:21 IPCP: I CONFREQ [REQsent] id 36 len 10  
Dec 30 18:12:43.287: Se0:21 IPCP: Address 10.1.1.66 (0x03060A010142)  
Dec 30 18:12:43.287: Se0:21 IPCP: O CONFACK [REQsent] id 36 len 10  
Dec 30 18:12:43.287: Se0:21 IPCP: Address 10.1.1.66 (0x03060A010142)  
Dec 30 18:12:43.287: Se0:21 CDPCP: I CONFREQ [Not negotiated] id 36 len 4  
Dec 30 18:12:43.291: Se0:21 LCP: O PROTREJ [Open] id 26 len 10 protocol CDPCP  
(0x820701240004)  
Dec 30 18:12:43.307: Se0:21 IPCP: I CONFACK [ACKsent] id 13 len 10  
Dec 30 18:12:43.307: Se0:21 IPCP: Address 10.1.1.65 (0x03060A010141)  
Dec 30 18:12:43.307: Se0:21 IPCP: State is Open  
Dec 30 18:12:43.307: Se0:21 DDR: dialer protocol up  
Dec 30 18:12:43.307: Di2 IPCP: Install route to 10.1.1.66
```

!--- A route to the peer is installed.

```
Dec 30 18:12:44.263: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:21,  
changed state to up  
Dec 30 18:12:49.135: %ISDN-6-CONNECT: Interface Serial0:21 is now connected to  
9996100 remoteISDN01
```

```
remoteISDN01#debug ppp negotiation  
PPP protocol negotiation debugging is on  
remoteISDN01#debug isdn q931  
ISDN Q931 packets debugging is on  
remoteISDN01#show debug  
PPP:  
  PPP protocol negotiation debugging is on  
ISDN:  
  ISDN Q931 packets debugging is on  
remoteISDN01#  
Dec 30 18:13:04: ISDN BR0: RX <- SETUP pd = 8 callref = 0x1B  
Dec 30 18:13:04: Bearer Capability i = 0x8890  
Dec 30 18:13:04: Channel ID i = 0x89  
Dec 30 18:13:04: Signal i = 0x40 - Alerting on - pattern 0  
Dec 30 18:13:04: Called Party Number i = 0xA1, '2019996100', Plan:ISDN,  
  Type:National  
Dec 30 18:13:04: ISDN BR0: Event: Received a DATA call from <unknown> on B1 at  
  64 Kb/s  
Dec 30 18:13:04: ISDN BR0: Event: Accepting the call id 0x2D  
Dec 30 18:13:04: %LINK-3-UPDOWN: Interface BRI0:1, changed state to up  
Dec 30 18:13:04: BR0:1 PPP: Treating connection as a callin  
Dec 30 18:13:04: BR0:1 PPP: Phase is ESTABLISHING, Passive Open [0 sess, 1 load]  
Dec 30 18:13:04: BR0:1 LCP: State is Listen  
Dec 30 18:13:04: ISDN BR0: TX -> CALL_PROC pd = 8 callref = 0x9B
```

!--- Outgoing ISDN Q.931 SETUP message.

```
Dec 30 18:13:04: Channel ID i = 0x89  
Dec 30 18:13:04: ISDN BR0: TX -> CONNECT pd = 8 callref = 0x9B  
Dec 30 18:13:05: BR0:1 LCP: I CONFREQ [Listen] id 25 len 15  
Dec 30 18:13:05: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
```

```
Dec 30 18:13:05: BR0:1 LCP: MagicNumber 0x4AA54104 (0x05064AA54104)
Dec 30 18:13:05: BR0:1 LCP: O CONFREQ [Listen] id 55 len 15
Dec 30 18:13:05: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 18:13:05: BR0:1 LCP: MagicNumber 0x575DC27D (0x0506575DC27D)
Dec 30 18:13:05: BR0:1 LCP: O CONFACK [Listen] id 25 len 15
Dec 30 18:13:05: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 18:13:05: BR0:1 LCP: MagicNumber 0x4AA54104 (0x05064AA54104)
Dec 30 18:13:05: ISDN BR0: RX <- CONNECT_ACK pd = 8 callref = 0x1B
```

!--- Received Q.931 CONNECT message.

```
Dec 30 18:13:05: Signal i = 0x4F - Alerting off
Dec 30 18:13:05: BR0:1 LCP: I CONFACK [ACKsent] id 55 len 15
Dec 30 18:13:05: BR0:1 LCP: AuthProto CHAP (0x0305C22305)
Dec 30 18:13:05: BR0:1 LCP: MagicNumber 0x575DC27D (0x0506575DC27D)
Dec 30 18:13:05: BR0:1 LCP: State is Open
Dec 30 18:13:05: BR0:1 PPP: Phase is AUTHENTICATING, by both [0 sess, 1 load]
Dec 30 18:13:05: BR0:1 CHAP: O CHALLENGE id 36 len 33 from "remoteISDN01"
Dec 30 18:13:05: BR0:1 CHAP: I CHALLENGE id 13 len 27 from "AS5300"
Dec 30 18:13:05: BR0:1 CHAP: Waiting for peer to authenticate first
Dec 30 18:13:05: BR0:1 CHAP: I RESPONSE id 36 len 27 from "AS5300"
Dec 30 18:13:05: BR0:1 CHAP: O SUCCESS id 36 len 4
Dec 30 18:13:05: BR0:1 CHAP: Processing saved Challenge, id 13
Dec 30 18:13:05: BR0:1 CHAP: O RESPONSE id 13 len 33 from "remoteISDN01"
Dec 30 18:13:05: BR0:1 CHAP: I SUCCESS id 13 len 4
```

!--- Two-way CHAP authentication is successful.

```
Dec 30 18:13:05: BR0:1 PPP: Phase is UP [0 sess, 0 load]
Dec 30 18:13:05: BR0:1 IPCP: O CONFREQ [Closed] id 36 len 10
Dec 30 18:13:05: BR0:1 IPCP: Address 10.1.1.66 (0x03060A010142)
Dec 30 18:13:05: BR0:1 CDPCP: O CONFREQ [Closed] id 36 len 4
Dec 30 18:13:05: BR0:1 IPCP: I CONFREQ [REQsent] id 13 len 10
Dec 30 18:13:05: BR0:1 IPCP: Address 10.1.1.65 (0x03060A010141)
Dec 30 18:13:05: BR0:1 IPCP: O CONFACK [REQsent] id 13 len 10
Dec 30 18:13:05: BR0:1 IPCP: Address 10.1.1.65 (0x03060A010141)
Dec 30 18:13:05: BR0:1 IPCP: I CONFACK [ACKsent] id 36 len 10
Dec 30 18:13:05: BR0:1 IPCP: Address 10.1.1.66 (0x03060A010142)
Dec 30 18:13:05: BR0:1 IPCP: State is Open
Dec 30 18:13:05: BR0:1 LCP: I PROTREJ [Open] id 26 len 10 protocol CDPCP
(0x8207 01240004)
Dec 30 18:13:05: BR0:1 CDPCP: State is Closed
Dec 30 18:13:05: BR0 IPCP: Install route to 10.1.1.65
```

!--- A route to the peer is installed.

```
Dec 30 18:13:06: %LINEPROTO-5-UPDOWN: Line protocol on Interface BRI0:1,
changed state to up
Dec 30 18:13:06: BR0:1 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 18:13:06: BR0:1 CDPCP: State is Closed
Dec 30 18:13:06: BR0:1 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 18:13:06: BR0:1 CDPCP: State is Closed
Dec 30 18:13:06: BR0:1 PPP: Outbound cdp packet dropped, CDPCP is Closed
[starting negotiations]
Dec 30 18:13:06: BR0:1 CDPCP: State is Closed
Dec 30 18:13:06: BR0:1 CDPCP: TIMEout: State Closed
Dec 30 18:13:06: BR0:1 CDPCP: State is Listen
Dec 30 18:13:10: %ISDN-6-CONNECT: Interface BRI0:1 is now connected to AS5300
```

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