

# 着信マルチリンク非同期および ISDN コール用の PRI を備えたアクセス サーバの設定

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## 概要

ほとんどの環境では、非同期および ISDN の両方のユーザから着信コールを受けられるようにアクセス サーバを設定しておく必要があります。アクセス サーバが設定されていると、どちらのユーザも物理的に接続されているかのようにスムーズにネットワークに接続できます。このような設定は、移動中のユーザや在宅勤務のユーザ、Small Office-Home Office ( SOHO ) サイトがネットワークに接続する場合にもよく使用します。

この文書では、着信の非同期および ISDN のコールを ISDN T1 PRI 回線で受信できるようにアクセス サーバを設定する方法を説明します。設定には、コール受信のために最小限必要なネットワーク アクセス サーバ ( NAS ) のセットアップが含まれています。必要に応じて、この設定に機能を追加できます。

## 前提条件

### 要件

このドキュメントに特有の要件はありません。

### 使用するコンポーネント

このドキュメントの情報は、次のソフトウェアとハードウェアのバージョンに基づいています。

- Cisco AS5300(192 MICAモデムおよびCisco IOS®ソフトウェアリリース12.2(5)が稼働する8つのT1ポートを搭載)
- 2つのT1 PRI
- Microsoft Windows を実行している PCこの PC には、アナログのモデムと、Public Switch Telephone Network (PSTN; 公衆電話交換網) に対する電話接続が搭載されています。PC から AS5300 に接続された T1 PRI にダイヤルします。
- ISDN BRI (基本速度インターフェイス) 回線を搭載した Cisco 800 および 1600 シリーズのルータ。これらのルータは、ISDN ダイアルイン クライアントです。Cisco 1600 用の設定が示されます。このクライアント設定を BRI インターフェイスを持つすべてのルータに適用できます。
- ローカル認証、許可、アカウントिंग (AAA) AAA Radius または Tacacs+ のサーバを所有している場合には、どちらかのサーバを使用して着信コールに AAA を提供できます。

注：Cisco 800ルータの設定は、Cisco 1600ルータの設定に似ていますが、このドキュメントには記載されていません。

このドキュメントの情報は、特定のラボ環境にあるデバイスに基づいて作成されました。このドキュメントで使用するすべてのデバイスは、初期 (デフォルト) 設定の状態から起動しています。対象のネットワークが実稼働中である場合には、どのようなコマンドについても、その潜在的な影響について確実に理解しておく必要があります。

## [関連製品](#)

この設定は、T1 または PRI のどちらかのカードと内部デジタル モデム (たとえば、MICA、NextPort または Microcom) を搭載しているどのルータにも使用できます。そのため、T1 または PRI のいずれかのカードとデジタル モデムを搭載した AS5xxx シリーズのルータにも、この設定の概念を使用できます。

Cisco 2600 シリーズ ルータは内部デジタル モデムをサポートしません。Cisco 2600 シリーズ ルータに T1、PRI WIC、またはネットワーク モジュールのいずれかがある場合は、ISDN コールのみを受け付けるようにこのルータを設定できます。

Cisco 3600 シリーズ ルータは、ISDN とモデムの両方のコールをサポートします。ただし、Cisco 3600 シリーズ ルータは、T1、PRI WIC、またはネットワーク モジュールのいずれかと NM-xDM デジタル モデム ネットワーク モジュールが必要になります。

または E1 または PRI ポートでこの設定を使用するように変更を加えることができます。Telco が提供するラインコーディング、フレーミング、およびその他の物理的な特性を備えた E1 コントローラを設定します。D チャネルの設定 (E1 コントローラに対してインターフェイス シリアル x:15 を使用) は、このドキュメントで説明した設定と類似しています。

## [表記法](#)

ドキュメント表記の詳細は、「[シスコ テクニカル ティップスの表記法](#)」を参照してください。

## [設定](#)

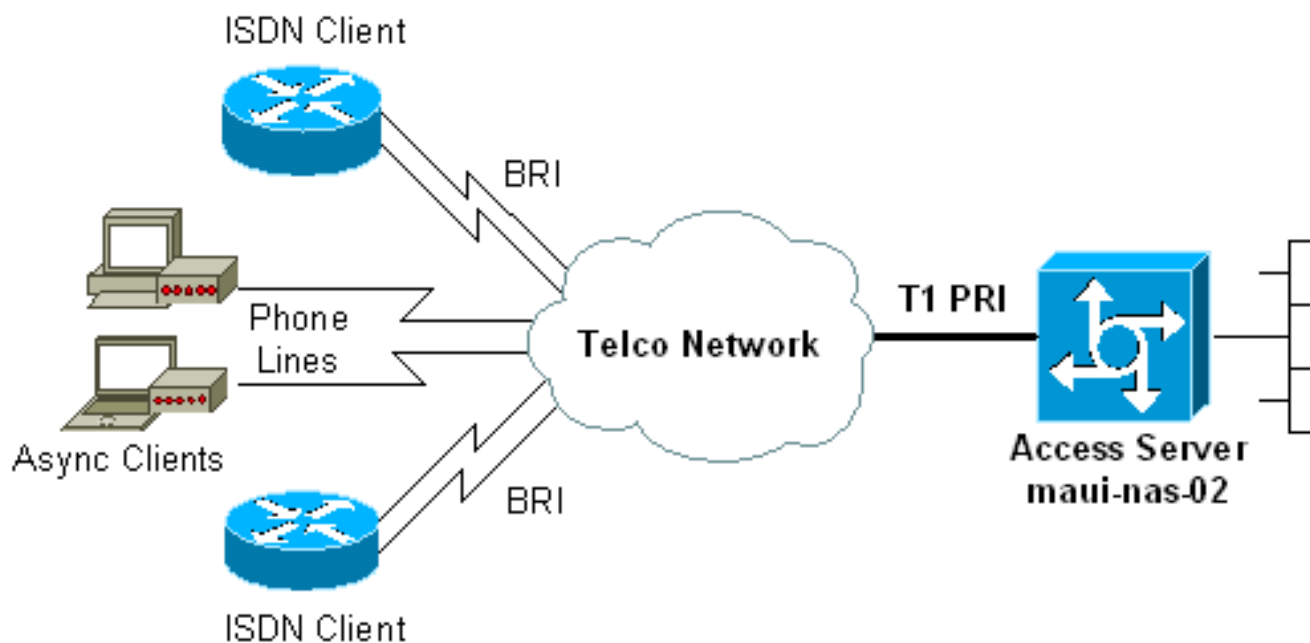
このセクションでは、このドキュメントで説明する機能を設定するために必要な情報を提供して

います。

注：この文書で使用されているコマンドの詳細を調べるには、「Command Lookup ツール」を使用してください（登録ユーザのみ）。

## ネットワーク図

このドキュメントでは、次のネットワーク セットアップを使用します。



## 設定

このドキュメントでは、次の構成を使用します。

- [maui-nas-02 \( 5300 \)](#)
- [maui-soho-01 \( 1600 \)](#)

### maui-nas-02 ( 5300 )

```
maui-nas-02#show running-config
Building configuration...

Current configuration : 3671 bytes
!
! No configuration change since last restart
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname maui-nas-02
!
boot system flash:c5300-i-mz.122-5.bin
aaa new-model
aaa authentication login default local
aaa authentication login NO_AUTHEN none
```

```

aaa authentication ppp default local
aaa authorization network default local
!--- PPP authentication and network authorization are
local. !--- Replace local with radius or tacacs if you
use an AAA server.

enable secret 5 <deleted>
!
username admin password 7 <deleted>
username async_user password 7 <deleted>
username travis_isdn password 7 <deleted>
username austin_isdn password 7 <deleted>
!--- Usernames for local authentication of the call.
!--- The client presents the username/password and the
NAS !--- authenticates the peer. spe 1/0 1/8 firmware
location mica-modem-pw.2.7.3.0.bin spe 2/0 2/7 firmware
location mica-modem-pw.2.7.3.0.bin ! ip subnet-zero ip
domain-name maui-onions.com !--- Tells the NAS how to
qualify DNS lookups. !--- In this example, maui-
onions.com is appended to the end of each !--- looked-up
name. ip name-server 172.22.53.210 !--- Specifies the
primary name server. ! async-bootp dns-server
172.22.53.210 !--- Specifies (for async clients) the IP
address of domain name servers. isdn switch-type
primary-ni !--- Switch-type for this NAS. Obtain this
information from the Telco. ! controller T1 0 !--- First
T1 PRI 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 NAS. !--- 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 now automatically creates the !--- corresponding
D-channel: interface Serial 0:23.

!
controller T1 1
!--- Second T1 PRI. framing esf !--- Framing for this
T1 is Extended Super Frame (ESF). !--- Obtain this
information from the Telco. clock source line secondary
1 !--- T1 1 is the first secondary clock source for this
NAS. !--- If the primary clock fails, this secondary
clock takes over. 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 now automatically creates the !--- corresponding
D-channel: interface Serial 1:23.

!
controller T1 2
!--- This T1 is unused. framing sf clock source line
secondary 2 linecode ami ! !--- Unused interface
configuration is omitted here. ! interface Loopback0 ip
address 172.22.60.1 255.255.255.0 !--- The IP pool for
async users is in this subnet. !--- The routes for all
async clients are summarized and !--- propagated to the
backbone instead of 254 routes. ! interface Loopback1 ip
address 172.22.61.1 255.255.255.0 !--- The IP pool for
ISDN users is in this subnet. !--- The routes for all
ISDN clients are summarized and !--- propagated to the

```

```
backbone instead of 254 routes. ! interface Ethernet0 ip
address 172.22.53.140 255.255.255.0 ! !--- Unused
interface configuration is omitted here. ! interface
Serial0:23 !--- D-channel configuration for T1 0. no ip
address encapsulation ppp !--- PPP encapsulation on this
interface. dialer rotary-group 10 !--- T1 0 is a member
of rotary group 10. !--- The rotary group configuration
is in interface Dialer 10. isdn switch-type primary-ni
isdn incoming-voice modem !--- All incoming voice calls
on this T1 are sent to the modems. !--- This command is
required if this T1 is to accept async calls. no cdp
enable ppp authentication chap ppp multilink ! interface
Serial1:23 !--- D-channel configuration for T1 1. no ip
address encapsulation ppp !--- PPP encapsulation on this
interface. dialer rotary-group 10 !--- T1 1 is a member
of rotary group 10. !--- The rotary group configuration
is in interface Dialer 10. isdn switch-type primary-ni
isdn incoming-voice modem !--- All incoming voice calls
on this T1 are sent to the modems. !--- This command is
required if this T1 is to accept async calls. no cdp
enable ppp authentication chap ppp multilink ! interface
Group-Async0 !--- This group-async interface is the
configuration template for all modems. !--- You need not
configure individual async interfaces because you can !-
-- clone the interfaces from one managed copy. ip
unnumbered Loopback0 !--- A Loopback interface is always
up/up. So, unnumber the loopback interface !--- for
stability. encapsulation ppp dialer in-band dialer idle-
timeout 900 dialer-group 5 !--- Interesting traffic is
defined in dialer-list 5. !--- Note: The specified
dialer-group number must be the same as the !--- dialer-
list number. In this example, the number is defined as
"5".
```

```
async mode interactive
```

```
!--- Users can dial in and get to a shell or PPP
session on that line. !--- You can use this command in
conjunction with autoselect ppp !--- under the line
configuration to automatically detect the connection
type.
```

```
peer default ip address pool ASYNC
!--- Clients are assigned addresses from the IP address
pool named ASYNC. no fair-queue ppp authentication chap
!--- Use CHAP authentication. ppp multilink group-range
1 192 !--- Modems 1 through 192 are members of this
group async interface. ! interface Dialer10 !---
Configuration for rotary group 10. !--- The Dialer
interface number (10) must exactly match rotary !---
group number configured on the physical interfaces. ip
unnumbered Loopback1 !--- A Loopback interface is always
up/up. So, unnumber the loopback interface !--- for
stability. encapsulation ppp dialer in-band !--- Enable
V.25bis on this interface. dialer idle-timeout 900 !---
Idle timeout for incoming calls is 900 seconds (15
mins). dialer-group 5 !--- Apply interesting traffic
definition from dialer-list 5. !--- Note: The specified
dialer-group number must be the same !--- as the dialer-
list number. !--- In this example, the number is defined
as "5".
```

```
peer default ip address pool ISDN
!--- Clients are assigned addresses from the IP
address pool named ISDN. ppp authentication chap ppp
```

```

multilink ! router eigrp 69 network 172.22.0.0 auto-
summary no eigrp log-neighbor-changes ! ip local pool
ASYNC 172.22.60.2 172.22.60.254 ip local pool ISDN
172.22.61.2 172.22.61.254 !--- IP address pools for
dialin clients. ip classless no ip http server ! access-
list 101 remark Interesting Traffic Definition to be
used in dialer-list 5 access-list 101 deny eigrp any any
access-list 101 permit ip any any dialer-list 5 protocol
ip list 101 !--- Access-list 101 defines interesting
traffic. This definition is applied !--- to interface
Dialer 10 and Group-Async 0 through dialer-group 5. !---
Note: The specified dialer-list number must be the same
as the !--- dialer-group number. In this example, the
number is defined as "5".

```

```

!
line con 0
  exec-timeout 0 0
  login authentication NO_AUTHEN
  !--- Apply AAA list NO_AUTHEN configured previously.
!--- That list has method "none". !--- There is no
authentication on the console port. line 1 192 modem
InOut !--- Support incoming and outgoing modem calls.
transport input all autoselect during-login ! ---
Displays the username:password prompt after modems
connect. autoselect ppp !--- Automatically launches PPP
if the router detects incoming PPP packets. !--- Without
this command the dialin client must manually !--- launch
PPP (from Exec mode). line aux 0 line vty 0 4 ! ntp
clock-period 17180107 ntp server 172.22.53.1 end

```

## maui-soho-01 ( 1600 )

```

maui-soho-01#show running-config
Building configuration...

Current configuration : 1609 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug datetime msec
service timestamps log datetime msec
service password-encryption
!
hostname maui-soho-01
!
logging rate-limit console 10 except errors
!
username admin password 7 <deleted>
ip subnet-zero
no ip finger
!
isdn switch-type basic-ni
  !--- Switch-type for the BRI circuit. Obtain this
information from the Telco. ! interface Ethernet0 ip
address 10.0.0.1 255.255.255.0 no keepalive ! interface
Serial0 no ip address shutdown ! interface BRI0 !--- BRI
physical interface configuration. no ip address !--- An
IP address is not required on the physical BRI interface
because !--- this is a dialer pool. !--- The IP
addressing functionality is in interface Dialer 1
(dialer pool). encapsulation ppp dialer pool-member 1 !---
Places the interface into dialer pool 1 from which

```

```
Dialer interfaces !--- can draw channels as needed. !---
Links the physical interface with the logical dialer
interfaces. !--- Dialer Pool 1 is defined in interface
Dialer 1. isdn switch-type basic-ni isdn spid1
51255511110101 5551111 isdn spid2 51255511120101 5551112
!--- Service Profile IDentifiers (SPIDs) are found
primarily in North America. !--- SPIDs are not required
for certain switch types. Confirm with your Telco. !---
If the Telco informs you that you do not need SPIDs, do
not use these !--- two SPID commands. ppp authentication
chap callin !--- Perform one way CHAP authentication.
ppp multilink !--- Permit multilink on this BRI
interface. ! interface Dialer1 !--- This dialer is the
logical interface for the dialer pool. ip address
negotiated !--- IP address for this interface is
obtained from the NAS during !--- IPCP negotiation.
Alternatively, you can also unnumber this interface !---
to a working interface (example, ethernet 0).
encapsulation ppp dialer pool 1 !--- Defines Dialer pool
1. !--- BRI 0 is a member of this pool. dialer idle-
timeout 900 !--- Idle-timout for this link is 900
seconds (15 minutes). !--- The link is disconnected if
there is no interesting traffic for 900 secs. dialer
string 81560 class 56k !--- Dial 81560 and use the map-
class named "56k". dialer load-threshold 1 outbound !---
Sets the outbound load level for traffic at which !---
additional connections are added to the MP bundle load
level. !--- Values range from 1 (unloaded) to 255 (fully
loaded). !--- With a threshold of 1, the additional
links are immediately !--- brought up and added to the
bundle. dialer-group 1 !--- Apply interesting traffic
definition from dialer-list 1. ppp authentication chap
callin !--- Use one way PPP CHAP authentication. ppp
chap hostname austin_isdn !--- Use the CHAP username
austin_isdn to authenticate to the other router. ppp
chap password 7 <deleted> !--- Use this CHAP password to
authenticate to the other router. ppp multilink !---
Allow multilink for the dialer profile. !--- Without
this command multilink is NOT negotiated. ! ! ip
classless ip route 0.0.0.0 0.0.0.0 Dialer1 !--- Set the
default route to be interface Dialer 1 (the dialer
pool). !--- Traffic sent to int Dialer1 causes the
dialer pool member (int BRI 0) !--- to be dialed. no ip
http server ! ! map-class dialer 56k !--- Map-class
named "56k" that you used with the dialer string in int
Dialer1. dialer isdn speed 56 !--- Set the speed of the
call to be 56k (the default speed is 64k). !--- This
setting is optional for your connection. !--- Consult
your Telco to find out if you need to configure the dial
!--- speed to 56k. access-list 101 remark Interesting
traffic for dialer-list 1 access-list 101 deny udp any
any eq ntp access-list 101 permit ip any any !--- Define
NTP traffic as NOT interesting to prevent periodic NTP
traffic !--- from keeping the link up indefinitely. !---
All other IP traffic is interesting. !--- Change this
depending on your traffic needs. dialer-list 1 protocol
ip list 101 !--- Access-list 101 defines interesting
traffic. !--- Apply this to interface Dialer 1 through
the command dialer-group 1. !--- Note: The specified
dialer-list number must be the same as the !--- dialer-
group number. In this example, the number is defined as
"1"
```

!

```
line con 0
  transport input none
line vty 0 4
  login
!
ntp clock-period 17042429
ntp server 172.22.53.1
end
```

## 確認

ここでは、設定が正しく機能していることを確認するために使用する情報を示します。

一部の show コマンドは[アウトプット インタープリタ ツールによってサポートされています \(登録ユーザ専用\)](#)。このツールを使用することによって、show コマンド出力の分析結果を表示できます。

- **show isdn status** : ルータが ISDN スイッチと正常に通信していることを確認します。出力で、 1 ACTIVE、 2 state = MULTIPLE\_FRAME\_ESTABLISHED このコマンドは、通信中のコールの数も表示します。詳細については、「[show isdn status コマンドを使用した BRI のトラブルシューティング](#)」を参照してください。
- **show ppp multilink** : 通信中のマルチリンクのバンドルに関する情報を表示します。このコマンドを使用して、マルチリンク接続を検証します。
- **show dialer [interface type number]** : DDR に設定されたインターフェイスの一般的な診断情報を表示します。ダイヤラが正常に始動すると、「Dialer state is data link layer up physical layer up NCP」ダイヤリングを開始したパケットのソース アドレスと宛先アドレスが、「Dial reason line」この show コマンドでは、タイマーの設定と接続がタイムアウトするまでの時間も表示されます。
- **show caller user username detail** : 特定ユーザのパラメータ (たとえば割り当てられている IP アドレス、PPP および PPP バンドル パラメータ) を表示します。所有している Cisco IOS ソフトウェアがこのコマンドをサポートしない場合には、show user コマンドを使用します。
- **show dialer map** : 設定したダイナミックおよびスタティックのダイヤラ マップを表示します。このコマンドを使用して、ダイナミック ダイヤラ マップが作成されているか確認できます。ダイヤラ マップがないと、パケットを送信できません。

## show のサンプル出力

次に、成功したコールに対する show コマンドの出力を示します。太字で書かれている部分とコメントに注意してください。自分が得た出力と、ここに示される出力とを比べてください。

### 全般的な表示

```
maui-nas-02#show users
  Line      User      Host(s)      Idle      Location
* 0 con 0   idle      idle         00:00:00
  97 tty 97  async_user Async interface 00:06:36  PPP: 172.22.60.2
!--- Async User. The IP address of the peer is indicated. Interface User Mode Idle Peer Address
Vi1      austin_isd Virtual PPP (Bundle) 00:03:35 172.22.61.2
Vi2      travis_isd Virtual PPP (Bundle) 00:00:20 172.22.61.3
```



```

!--- Virtual-Access Interface for the two multilink PPP users. Se0:1      austin_isd Sync PPP
- Bundle: Vi1
  Se0:2      austin_isd Sync PPP      - Bundle: Vi1
!--- User austin_isdn is connected through two B-channels(Multilink PPP). !--- Interface
Virtual-Access 1 (Vi1) controls the two B-channels. Se0:3      travis_isd Sync PPP
- Bundle: Vi2
  Se0:4      travis_isd Sync PPP      - Bundle: Vi2
!--- User travis_isdn is connected through two B-channels (Multilink PPP). !--- Interface
Virtual-Access 2 (Vi2) controls the two B-channels. maui-nas-02#show dialer map
!--- Observe the Dynamic Dialer Maps created for each dialin client. Dynamic dialer map ip
172.22.60.2 name async_user () on As97 Dynamic dialer map ip 172.22.61.2 name austin_isdn () on
Di10 Dynamic dialer map ip 172.22.61.3 name travis_isdn () on Di10

```

maui-nas-02#show users

Line	User	Host(s)	Idle	Location
* 0 con 0		idle	00:00:00	
97 tty 97	async_user	Async interface	00:06:36	PPP: 172.22.60.2

```

!--- Async User. The IP address of the peer is indicated. Interface User Mode Idle Peer Address
Vi1      austin_isd Virtual PPP (Bundle) 00:03:35 172.22.61.2
Vi2      travis_isd Virtual PPP (Bundle) 00:00:20 172.22.61.3
!--- Virtual-Access Interface for the two multilink PPP users. Se0:1      austin_isd Sync PPP
- Bundle: Vi1
  Se0:2      austin_isd Sync PPP      - Bundle: Vi1
!--- User austin_isdn is connected through two B-channels(Multilink PPP). !--- Interface
Virtual-Access 1 (Vi1) controls the two B-channels. Se0:3      travis_isd Sync PPP
- Bundle: Vi2
  Se0:4      travis_isd Sync PPP      - Bundle: Vi2

```

```

!--- User travis_isdn is connected through two B-channels (Multilink PPP). !--- Interface
Virtual-Access 2 (Vi2) controls the two B-channels. maui-nas-02#show dialer map
!--- Observe the Dynamic Dialer Maps created for each dialin client. Dynamic dialer map ip
172.22.60.2 name async_user () on As97 Dynamic dialer map ip 172.22.61.2 name austin_isdn () on
Di10 Dynamic dialer map ip 172.22.61.3 name travis_isdn () on Di10

```

maui-nas-02#show users

Line	User	Host(s)	Idle	Location
* 0 con 0		idle	00:00:00	
97 tty 97	async_user	Async interface	00:06:36	PPP: 172.22.60.2

```

!--- Async User. The IP address of the peer is indicated. Interface User Mode Idle Peer Address
Vi1      austin_isd Virtual PPP (Bundle) 00:03:35 172.22.61.2
Vi2      travis_isd Virtual PPP (Bundle) 00:00:20 172.22.61.3
!--- Virtual-Access Interface for the two multilink PPP users. Se0:1      austin_isd Sync
PPP      - Bundle: Vi1
  Se0:2      austin_isd Sync PPP      - Bundle: Vi1
!--- User austin_isdn is connected through two B-channels(Multilink PPP). !--- Interface
Virtual-Access 1 (Vi1) controls the two B-channels. Se0:3      travis_isd Sync PPP
- Bundle: Vi2
  Se0:4      travis_isd Sync PPP      - Bundle: Vi2
!--- User travis_isdn is connected through two B-channels (Multilink PPP). !--- Interface
Virtual-Access 2 (Vi2) controls the two B-channels. maui-nas-02#show dialer map
!--- Observe the Dynamic Dialer Maps created for each dialin client. Dynamic dialer map ip
172.22.60.2 name async_user () on As97 Dynamic dialer map ip 172.22.61.2 name austin_isdn () on
Di10 Dynamic dialer map ip 172.22.61.3 name travis_isdn () on Di10

```

## アナログ コールの場合

maui-nas-02#show caller user async\_user detail

```

User: async_user, line tty 97, service Async
!--- Shows hardware-level settings for the user named async_user. Active time 00:00:34,
Idle time 00:00:16 Timeouts: Absolute Idle Idle Session Exec Limits: - - 00:10:00 Disconnect in:
- - - TTY: Line 97, running PPP on As97

```

*!--- The call is terminated on interface Async 97. !--- This interface is included in the Group-Async configuration. Location: PPP: 172.22.60.2*

*!--- IP address for the peer. This address is obtained from the IP pool "ASYNC". DS0: (slot/unit/channel)=0/0/2*

*!--- T1 channel on which the call arrived. !--- The call arrived on channel 0 in T1 0.*  
Line: Baud rate (TX/RX) is 115200/115200, no parity, 1 stopbits, 8 databits Status: Ready, Active, No Exit Banner, Async Interface Active HW PPP Support Active Capabilities: Hardware Flowcontrol In, Hardware Flowcontrol Out Modem Callout, Modem RI is CD, Line usable as async interface, Integrated Modem Modem State: Ready **User: async\_user, line As97, service PPP**

*!--- PPP setting for the user named async\_user. !--- Notice that the call is terminated on int Async97.* Active time 00:00:32, Idle time 00:00:30 Timeouts: Absolute Idle Limits: - 00:15:00 Disconnect in: - 00:14:28 PPP: **LCP Open**, multilink Closed, CHAP (<- AAA), IPCP

*!--- LCP state is OPEN. If LCP state is not OPEN, !--- use debug ppp negotiation to isolate LCP issues.*

LCP: -> peer, ACCM, AuthProto, MagicNumber, PCompression, ACCompression  
<- peer, ACCM, MagicNumber, PCompression, ACCompression

**NCP: Open IPCP**

*!--- IPCP state is open. If IPCP state is not OPEN, !--- use debug ppp negotiation to isolate IPCP issues.*

IPCP: <- peer, Address  
-> peer, Address

Dialer: Connected, inbound  
Idle timer 900 secs, idle 31 secs  
Type is IN-BAND ASYNC, group As97

**IP: Local 172.22.60.1, remote 172.22.60.2**

*!--- NAS IP address and the IP address assigned to the peer. Counts: 27 packets input, 1545 bytes, 0 no buffer*

1 input errors, 1 CRC, 0 frame, 0 overrun  
**14 packets output, 347 bytes**, 0 underruns  
0 output errors, 0 collisions, 0 interface resets

*!--- Packets pass through the connection.*

## ISDN コールの場合

maui-nas-02#show caller user austin\_isdn detail

*!--- The user named austin\_isdn has two PPP links, !--- and one virtual interface bundle.*

**User: austin\_isdn, line Se0:3, service PPP**

*!--- Shows PPP layer settings for the first channel !--- that belongs to the user named austin\_isdn.* Active time 00:04:01, Idle time 00:00:00 Timeouts: Absolute Idle Limits: - - Disconnect in: - - PPP: **LCP Open**, multilink Open, CHAP (<- AAA)

*!--- LCP state is OPEN. If LCP state is not OPEN, !--- use debug ppp negotiation to isolate LCP issues.*

LCP: -> peer, AuthProto, MagicNumber, MRRU, EndpointDisc  
<- peer, MagicNumber, MRRU, EndpointDisc

Dialer: **Connected, inbound**  
**Type is ISDN, group Di10**

*!--- Incoming call used rotary group of int Dialer 10. IP: Local 172.22.61.1*

*!--- IP address of the int Loopback 1. !--- Remember that int Dialer 1 was unnumbered to Loop 1. !--- The remote IP address is indicated under the virtual-interface.* Bundle: Member of austin\_isdn, last input 00:00:00 Counts: 55 packets input, 1635 bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 82 packets output, 3479 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets **User: austin\_isdn, line Se0:4, service PPP**

*!--- Shows PPP layer settings for the second channel !--- that belongs to the user named austin\_isdn.* Active time 00:03:59, Idle time 00:00:00 Timeouts: Absolute Idle Limits: - - Disconnect in: - - PPP: LCP Open, multilink Open, CHAP (<- AAA) LCP: -> peer, AuthProto, MagicNumber, MRRU, EndpointDisc <- peer, MagicNumber, MRRU, EndpointDisc Dialer: Connected to , inbound Type is ISDN, group Di10 IP: Local 172.22.61.1 Bundle: Member of austin\_isdn, last input 00:00:00 Counts: 50 packets input, 1589 bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 77 packets output, 3429 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets **User: austin\_isdn, line Vi1, service PPP Bundle**

```
!--- Shows Virtual-Access Interface Bundle that controls the connections. Active time
00:04:02, Idle time 00:04:01 Timeouts: Absolute Idle Limits: - 00:15:00 Disconnect in: -
00:10:58 PPP: LCP Open, multilink Open, IPCP, CDPCP LCP: -> peer, MagicNumber, MRRU,
EndpointDisc <- peer NCP: Open IPCP, CDPCP
!--- IPCP State is open. If IPCP state is not OPEN, !--- use debug ppp negotiation to
isolate IPCP issues.
```

```
IPCP: <- peer, Address
      -> peer, Address
Dialer: Connected, inbound
        Idle timer 900 secs, idle 1 secs
        Type is IN-BAND SYNC, group Di10
IP: Local 172.22.61.1, remote 172.22.61.2
```

```
!--- Dialer interface (Local) IP address !--- and the IP address assigned to the peer.
Bundle: First link of austin_isdn, 2 links, last input 00:00:01 Counts: 12 packets input, 1712
bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 67 packets output, 5030 bytes, 0
underruns 0 output errors, 0 collisions, 0 interface resets
```

## トラブルシューティング

ここでは、設定のトラブルシューティングに使用できる情報を示します。

### トラブルシューティングのリソース

必要に応じて、これらのリソースを使用してください。

- [着信モデム コールのトラブルシューティング](#) : このドキュメントを使用してアナログ コール障害のトラブルシューティングを行います。
- [PRI 非同期モデム コール](#) : このドキュメントを使用してアナログ コール障害のトラブルシューティングの追加情報を調べます。
- [着信 ISDN コールのトラブルシューティング](#) : このドキュメントを使用して ISDN コール障害のトラブルシューティングを行います。
- [PRI ISDN コール](#) : このドキュメントを使用して ISDN コール障害のトラブルシューティングの追加情報を調べます。
- [T1トラブルシューティングフローチャート](#) : T1回線が正しく動作していないと思われる場合は、このフローチャートを使用します。
- [T1/56K回線のループバックテスト](#) : このドキュメントを使用して、ルータのT1ポートが正しく機能していることを確認します。

### トラブルシューティングのためのコマンド

一部の show コマンドは [アウトプット インタープリタ ツールによってサポートされています \(登録ユーザ専用\)](#)。このツールを使用することによって、show コマンド出力の分析結果を表示できます。

注 : debug コマンドを使用する前に、「[debug コマンドに関する重要な情報](#)」を参照してください。

- **debug dialer** : ダイアラ インターフェイスで受信されたパケットに関する DDR デバッグ情報を表示します。この情報により、ダイアラ インターフェイスを使用する対象トラフィックが存在することを確認できます。
- **debug isdn q931** : ISDNネットワーク接続 (レイヤ3) のコールセットアップと切断を表示します。

- **debug modem** : アクセスサーバ上のモデム回線動作を表示します。モデム回線の状態が変化すると出力が表示されます。
- **debug modem csm** : 内部デジタル モデムを搭載するルータ上で発生した、コールスイッチングモジュール ( CSM ) の問題をトラブルシューティングすることができます。このコマンドを使用すると、着信および発信のコールのスイッチングについて、完全なシーケンスをトレースできます。
- **debug ppp negotiation** : PPP トラフィックと交換に関する情報を表示して、Link Control Protocol ( LCP )、認証、および Network Control Protocol ( NCP ) のネゴシエーションを行います。PPP ネゴシエーションが成功すると、最初に LCP ステートが開き、次に認証が行われ、そして最後に NCP のネゴシエーションが行われます。Maximum Receive Reconstructed Unit ( MRRU ) などのマルチリンクパラメータは、LCP ネゴシエーションの間に確立されます。
- **debug ppp authentication** : CHAP パケット交換および Password Authentication Protocol ( PAP ) 交換などを含む、PPP 認証のプロトコルメッセージが表示されます。
- **debug ppp error** : PPP 接続のネゴシエーションと操作に関するプロトコルエラーとエラー統計情報を表示します。

## デバッグの出力例

次に、成功したコールに対するデバッグ出力を示します。太字で書かれている部分とコメントに注意してください。自分が得た出力と、ここに示される出力とを比べてください。

## アナログコールの場合

```
maui-nas-02#debug isdn q931
ISDN Q931 packets debugging is on
maui-nas-02#debug modem
Modem control/process activation debugging is on
maui-nas-02#debug modem csm
Modem Management Call Switching Module debugging is on
maui-nas-02#debug ppp negotiation
PPP protocol negotiation debugging is on
maui-nas-02#debug ppp authentication
PPP authentication debugging is on

maui-nas-02#
Sep 28 13:13:28.369: ISDN Se0:23: RX <-  SETUP pd = 8  callref = 0x5285

    !--- Incoming Q.931 SETUP message. This indicates an incoming call. !--- For more
information on Q.931 refer to !--- Troubleshooting ISDN BRI Layer 3 using the debug isdn q931
Command.

Sep 28 13:13:28.369:  Bearer Capability i = 0x9090A2
Sep 28 13:13:28.369:  Channel ID i = 0xA18383
Sep 28 13:13:28.369:  Progress Ind i = 0x8183 - Origination address is non-ISDN
Sep 28 13:13:28.369:  Called Party Number i = 0xA1, '81560', Plan:ISDN, Type:National
Sep 28 13:13:28.373: VDEV_ALLOCATE: 2/0 is allocated

    !--- The Call Switch Module (CSM) is informed about the call. !--- The CSM allocates modem
2/0 to the incoming call. Sep 28 13:13:28.373: EVENT_FROM_ISDN::dchan_idb=0x618569F4,
call_id=0x28, ces=0x0 bchan=0x2, event=0x1, cause=0x0 Sep 28 13:13:28.373: dev in call to isdn :
set dnis_collected & fap_notify Sep 28 13:13:28.373: EVENT_FROM_ISDN:(0028): DEV_INCALL at slot
2 and port 0 Sep 28 13:13:28.373: EVENT_FROM_ISDN: decode:calling Oct3 0x0, called oct3 0xA1,
oct3a 0x0,mask 0x3C Sep 28 13:13:28.373: EVENT_FROM_ISDN: csm_call_info:calling Oct3 0x0, called
oct3 0xA1, oct3a 0x0,mask 0x3C Sep 28 13:13:28.377: CSM_PROC_IDLE: CSM_EVENT_ISDN_CALL at slot
```

2, port 0 Sep 28 13:13:28.377: Mica Modem(2/0): Configure(0x1 = 0x0) Sep 28 13:13:28.377: Mica Modem(2/0): Configure(0x23 = 0x0) Sep 28 13:13:28.377: **Mica Modem(2/0): Call Setup**

*!--- CSM sends the Call Setup Message to Modem 2/0. !--- The modem must now go off-hook.*

Sep 28 13:13:28.377: csm\_connect\_pri\_vdev: TS allocated at bp\_stream 0, bp\_Ch 0, vdev\_common 0x6141BB68 Sep 28 13:13:28.377: ISDN Se0:23: **TX -> CALL\_PROC** pd = 8 callref = 0xD285

Sep 28 13:13:28.377: Channel ID i = 0xA98383

*!--- The Call Proceeding Message is sent through the D-channel.* Sep 28 13:13:28.377: ISDN Se0:23: TX -> ALERTING pd = 8 callref = 0xD285 Sep 28 13:13:28.445: **Mica Modem(2/0): State Transition to Call Setup**

*!--- Modem transitions to state Call Setup. !--- For more information on MICA Modem States refer to [MICA Modem States](#).* Sep 28 13:13:28.445: **Mica Modem(2/0): Went offhook**

*!--- Modem informs the CSM that it went offhook.* Sep 28 13:13:28.445: CSM\_PROC\_IC2\_RING: CSM\_EVENT\_MODEM\_OFFHOOK at slot 2, port 0 Sep 28 13:13:28.445: ISDN Se0:23: **TX -> CONNECT** pd = 8 callref = 0xD285

*!--- D-channel transmits a CONNECT.* Sep 28 13:13:28.461: ISDN Se0:23: **RX <- CONNECT\_ACK** pd = 8 callref = 0x5285

*!--- The Q.931 CONNECT\_ACK message is received.* Sep 28 13:13:28.461: ISDN Se0:23: CALL\_PROGRESS: CALL\_CONNECTED call id 0x28, bchan 2, dsl 0 Sep 28 13:13:28.461: EVENT\_FROM\_ISDN::dchan\_idb=0x618569F4, call\_id=0x28, ces=0x0 bchan=0x2, event=0x4, cause=0x0 Sep 28 13:13:28.461: EVENT\_FROM\_ISDN:(0028): DEV\_CONNECTED at slot 2 and port 0 Sep 28 13:13:28.461: CSM\_PROC\_IC6\_WAIT\_FOR\_CONNECT: CSM\_EVENT\_ISDN\_CONNECTED at slot 2, port 0 Sep 28 13:13:28.465: **Mica Modem(2/0): Link Initiate**

*!--- When the Q.931 CONNECT\_ACK message is received, the Link initiate message !--- is sent to the MICA modem, and negotiation with remote modem occurs.* Sep 28 13:13:28.465: %ISDN-6-CONNECT: Interface Serial0:2 is now connected to N/A N/A Sep 28 13:13:29.557: **Mica Modem(2/0): State Transition to Connect**

*!--- Modem moves to the Connect state.* Sep 28 13:13:34.073: Mica Modem(2/0): State Transition to Link Sep 28 13:13:45.478: Mica Modem(2/0): State Transition to Trainup Sep 28 13:13:53.642: Mica Modem(2/0): State Transition to EC Negotiating Sep 28 13:13:54.122: **Mica Modem(2/0): State Transition to Steady State**

*!--- Modem transitions to the Steady state.* Sep 28 13:13:54.266: TTY97: DSR came up *!--- Indicates that the modem trainup is complete.* Sep 28 13:13:54.266: tty97: Modem: IDLE->(unknown) Sep 28 13:13:54.266: TTY97: EXEC creation Sep 28 13:13:54.266: TTY97: set timer type 10, 30 seconds Sep 28 13:13:57.202: TTY97: Autoselect(2) sample 7E Sep 28 13:13:57.202: TTY97: Autoselect(2) sample 7EFF Sep 28 13:13:57.202: TTY97: Autoselect(2) sample 7EFF7D Sep 28 13:13:57.202: TTY97: Autoselect(2) sample 7EFF7D23 Sep 28 13:13:57.202: TTY97 Autoselect cmd: ppp negotiate *!--- The router detects PPP packets and automatically launches PPP.* Sep 28 13:13:57.206: TTY97: EXEC creation Sep 28 13:13:57.206: TTY97: create timer type 1, 600 seconds Sep 28 13:13:57.334: TTY97: destroy timer type 1 Sep 28 13:13:57.334: TTY97: no timer type 0 to destroy Sep 28 13:13:57.334: As97 IPCP: Install route to 172.22.60.2 Sep 28 13:13:59.334: %LINK-3-UPDOWN: Interface Async97, changed state to up Sep 28 13:13:59.334: As97 PPP: Treating connection as a callin Sep 28 13:13:59.334: As97 PPP: Phase is ESTABLISHING, Passive Open [0 sess, 0 load] Sep 28 13:13:59.334: As97 LCP: State is Listen *!--- LCP negotiation begins.* Sep 28 13:14:00.214: As97 LCP: I CONFREQ [Listen] id 3 len 23 *!--- Incoming LCP CONFREQ. !--- For more information on how to interpret PPP debugs, refer to !--- [Dialup Technology: Troubleshooting Techniques](#).* Sep 28 13:14:00.214: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:00.214: As97 LCP: MagicNumber 0x0F7CD34A (0x05060F7CD34A) Sep 28 13:14:00.214: As97 LCP: PFC (0x0702) Sep 28 13:14:00.214: As97 LCP: ACFC (0x0802) Sep 28 13:14:00.214: As97 LCP: Callback 6 (0x0D0306) Sep 28 13:14:00.214: Unthrottle 97 Sep 28 13:14:00.214: As97 LCP: O CONFREQ [Listen] id 1 len 43 Sep 28 13:14:00.214: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:00.214: As97 LCP: AuthProto CHAP (0x0305C22305) Sep 28 13:14:00.214: As97 LCP: MagicNumber 0x3090DE31 (0x05063090DE31) Sep 28 13:14:00.214: As97 LCP: PFC (0x0702) Sep 28 13:14:00.214: As97 LCP: ACFC (0x0802) Sep 28 13:14:00.214: As97 LCP: MRRU 1524 (0x110405F4) Sep 28 13:14:00.214: As97 LCP: EndpointDisc 1 Local ( 0x130E016D6175692D6E61732D3032) Sep 28 13:14:00.214: As97 LCP: O CONFREQ [Listen] id 3 len 7 Sep 28 13:14:00.214: As97 LCP: Callback 6 (0x0D0306) Sep 28 13:14:00.342: As97 LCP: I CONFREQ [REQsent] id 4 len 20 Sep 28 13:14:00.342: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:00.342: As97 LCP: MagicNumber 0x0F7CD34A (0x05060F7CD34A) Sep 28 13:14:00.342: As97 LCP: PFC (0x0702) Sep 28 13:14:00.342: As97 LCP: ACFC (0x0802) Sep 28 13:14:00.342: As97 LCP: O CONFACK [REQsent] id 4 len 20 Sep 28 13:14:00.342: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:00.342: As97 LCP: MagicNumber 0x0F7CD34A (0x05060F7CD34A) Sep 28 13:14:00.342: As97 LCP: PFC (0x0702) Sep 28 13:14:00.342: As97 LCP: ACFC (0x0802) Sep 28 13:14:02.214: As97 LCP: TIMEOUT: State ACKsent Sep 28 13:14:02.214: As97 LCP: O CONFREQ [ACKsent] id 2 len 43 Sep 28 13:14:02.214: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:02.214: As97 LCP: AuthProto CHAP (0x0305C22305) Sep 28 13:14:02.214: As97 LCP:

MagicNumber 0x3090DE31 (0x05063090DE31) Sep 28 13:14:02.214: As97 LCP: PFC (0x0702) Sep 28 13:14:02.214: As97 LCP: ACFC (0x0802) Sep 28 13:14:02.214: As97 LCP: MRRU 1524 (0x110405F4) Sep 28 13:14:02.214: As97 LCP: EndpointDisc 1 Local (0x130E016D6175692D6E61732D3032) Sep 28 13:14:02.326: As97 LCP: I CONFREJ [ACKsent] id 2 len 22 Sep 28 13:14:02.326: As97 LCP: MRRU 1524 (0x110405F4) Sep 28 13:14:02.326: As97 LCP: EndpointDisc 1 Local (0x130E016D6175692D6E61732D3032) Sep 28 13:14:02.326: As97 LCP: O CONFREQ [ACKsent] id 3 len 25 Sep 28 13:14:02.326: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:02.326: As97 LCP: AuthProto CHAP (0x0305C22305) Sep 28 13:14:02.326: As97 LCP: MagicNumber 0x3090DE31 (0x05063090DE31) Sep 28 13:14:02.326: As97 LCP: PFC (0x0702) Sep 28 13:14:02.326: As97 LCP: ACFC (0x0802) Sep 28 13:14:02.518: As97 LCP: I CONFACK [ACKsent] id 3 len 25 Sep 28 13:14:02.518: As97 LCP: ACCM 0x000A0000 (0x0206000A0000) Sep 28 13:14:02.518: As97 LCP: AuthProto CHAP (0x0305C22305) Sep 28 13:14:02.518: As97 LCP: MagicNumber 0x3090DE31 (0x05063090DE31) Sep 28 13:14:02.518: As97 LCP: PFC (0x0702) Sep 28 13:14:02.518: As97 LCP: ACFC (0x0802) Sep 28 13:14:02.518: **As97 LCP: State is Open**

*!---* LCP negotiation is complete. Sep 28 13:14:02.518: As97 PPP: Phase is AUTHENTICATING, by this end [0 sess, 0 load] Sep 28 13:14:02.518: As97 CHAP: O CHALLENGE id 1 len 32 from "maui-nas-02" Sep 28 13:14:02.646: As97 CHAP: I RESPONSE id 1 len 31 from "async\_user" Sep 28 13:14:02.646: As97 AUTH: Started process 0 pid 34 Sep 28 13:14:02.650: **As97 CHAP: O SUCCESS** id 1 len 4

*!---* CHAP authentication is successful. *!---* If authentication fails, check the username and password. *!---* Refer to [Dialup Technology: Troubleshooting Techniques](#) . Sep 28 13:14:02.650: As97 PPP: Phase is UP [0 sess, 0 load] Sep 28 13:14:02.650: As97 **IPCP: O CONFREQ** [Closed] id 1 len 10

*!---* IPCP negotiation begins. Sep 28 13:14:02.650: As97 IPCP: Address 172.22.60.1 (0x0306AC163C01) Sep 28 13:14:02.758: As97 IPCP: I CONFREQ [REQsent] id 1 len 40 Sep 28 13:14:02.758: As97 IPCP: CompressType VJ 15 slots CompressSlotID (0x0206002D0F01) Sep 28 13:14:02.758: As97 IPCP: Address 0.0.0.0 (0x030600000000) Sep 28 13:14:02.758: As97 IPCP: PrimaryDNS 172.22.53.210 (0x8106AC1635D2) Sep 28 13:14:02.758: As97 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) Sep 28 13:14:02.758: As97 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) Sep 28 13:14:02.758: As97 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) Sep 28 13:14:02.758: As97 AAA/AUTHOR/IPCP: Start. Her address 0.0.0.0, we want 172.22.60.2 Sep 28 13:14:02.758: As97 **AAA/AUTHOR/IPCP: Done.**

**Her address 0.0.0.0, we want 172.22.60.2**

*!---* Address is obtained from the Address Pool named "Async". Sep 28 13:14:02.758: As97 IPCP: O CONFREQ [REQsent] id 1 len 28 Sep 28 13:14:02.758: As97 IPCP: CompressType VJ 15 slots CompressSlotID (0x0206002D0F01) Sep 28 13:14:02.758: As97 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) Sep 28 13:14:02.758: As97 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) Sep 28 13:14:02.758: As97 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) Sep 28 13:14:02.802: As97 CCP: I CONFREQ [Not negotiated] id 1 len 15 Sep 28 13:14:02.802: As97 CCP: MS-PPC supported bits 0x00000001 (0x120600000001) Sep 28 13:14:02.802: As97 CCP: Stacker history 1 check mode EXTENDED (0x1105000104) Sep 28 13:14:02.802: As97 LCP: O PROTREJ [Open] id 4 len 21 protocol CCP Sep 28 13:14:02.802: As97 LCP: (0x80FD0101000F12060000000111050001) Sep 28 13:14:02.802: As97 LCP: (0x04) Sep 28 13:14:02.802: As97 IPCP: I CONFACK [REQsent] id 1 len 10 Sep 28 13:14:02.802: As97 IPCP: Address 172.22.60.1 (0x0306AC163C01) Sep 28 13:14:04.650: As97 IPCP: TIMEOUT: State ACKrcvd Sep 28 13:14:04.650: As97 IPCP: O CONFREQ [ACKrcvd] id 2 len 10 Sep 28 13:14:04.650: As97 IPCP: Address 172.22.60.1 (0x0306AC163C01) Sep 28 13:14:04.758: As97 IPCP: I CONFACK [REQsent] id 2 len 10 Sep 28 13:14:04.758: As97 IPCP: Address 172.22.60.1 (0x0306AC163C01) Sep 28 13:14:05.750: As97 IPCP: I CONFREQ [ACKrcvd] id 2 len 34 Sep 28 13:14:05.750: As97 IPCP: Address 0.0.0.0 (0x030600000000) Sep 28 13:14:05.750: As97 IPCP: PrimaryDNS 172.22.53.210 (0x8106AC1635D2) Sep 28 13:14:05.750: As97 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) Sep 28 13:14:05.750: As97 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) Sep 28 13:14:05.750: As97 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) Sep 28 13:14:05.750: As97 AAA/AUTHOR/IPCP: Start. Her address 0.0.0.0, we want 172.22.60.2 Sep 28 13:14:05.750: As97 AAA/AUTHOR/IPCP: Done. Her address 0.0.0.0, we want 172.22.60.2 Sep 28 13:14:05.750: As97 IPCP: O CONFREQ [ACKrcvd] id 2 len 22 Sep 28 13:14:05.750: As97 IPCP: PrimaryWINS 0.0.0.0 (0x820600000000) Sep 28 13:14:05.754: As97 IPCP: SecondaryDNS 0.0.0.0 (0x830600000000) Sep 28 13:14:05.754: As97 IPCP: SecondaryWINS 0.0.0.0 (0x840600000000) Sep 28 13:14:05.878: As97 IPCP: I CONFREQ [ACKrcvd] id 3 len 16 Sep 28 13:14:05.878: As97 IPCP: Address 0.0.0.0 (0x030600000000) Sep 28 13:14:05.878: As97 IPCP: PrimaryDNS 172.22.53.210 (0x8106AC1635D2) Sep 28 13:14:05.878: As97 AAA/AUTHOR/IPCP: Start. Her address 0.0.0.0, we want 172.22.60.2 Sep 28 13:14:05.878: As97 AAA/AUTHOR/IPCP: Done. Her address 0.0.0.0, we want 172.22.60.2 Sep 28 13:14:05.878: As97 IPCP: O CONFNAK [ACKrcvd] id 3 len 10 Sep 28 13:14:05.878: As97 IPCP: Address 172.22.60.2 (0x0306AC163C02) Sep 28 13:14:05.990: As97 IPCP: I CONFREQ [ACKrcvd] id 4 len 16 Sep 28 13:14:05.990: As97 IPCP: Address 172.22.60.2 (0x0306AC163C02) Sep 28 13:14:05.990: As97 IPCP: PrimaryDNS 172.22.53.210 (0x8106AC1635D2) Sep

28 13:14:05.990: As97 AAA/AUTHOR/IPCP: Start. Her address 172.22.60.2, we want 172.22.60.2 Sep  
28 13:14:05.990: As97 AAA/AUTHOR/IPCP: Reject 172.22.60.2, using 172.22.60.2 Sep 28  
13:14:05.990: As97 AAA/AUTHOR/IPCP: Done. Her address 172.22.60.2, we want 172.22.60.2 Sep 28  
13:14:05.994: As97 IPCP: O CONFACK [ACKrcvd] id 4 len 16 Sep 28 13:14:05.994: As97 IPCP: Address  
172.22.60.2 (0x0306AC163C02) Sep 28 13:14:05.994: As97 IPCP: PrimaryDNS 172.22.53.210  
(0x8106AC1635D2) Sep 28 13:14:05.994: **As97 IPCP: State is Open**  
*!--- IPCP negotiation is complete. The user is now connected.*

## ISDN コールの場合

maui-nas-02#**debug isdn q931**

ISDN Q931 packets debugging is on  
maui-nas-02#**debug ppp negotiation**  
PPP protocol negotiation debugging is on  
maui-nas-02#**debug ppp authentication**  
PPP authentication debugging is on

Sep 28 13:25:02.630: ISDN Se0:23: **RX <- SETUP** pd = 8 callref = 0x5346

*!--- Incoming Q.931 Setup message.* Sep 28 13:25:02.630: Bearer Capability i = 0x8890218F  
Sep 28 13:25:02.630: Channel ID i = 0xA18384 Sep 28 13:25:02.630: Called Party Number i = 0xA1,  
'81560', Plan:ISDN, Type:National Sep 28 13:25:02.634: %LINK-3-UPDOWN: Interface Serial0:3,  
changed state to up Sep 28 13:25:02.638: Se0:3 PPP: Treating connection as a callin Sep 28  
13:25:02.638: Se0:3 PPP: Phase is ESTABLISHING, Passive Open [0 sess, 1 load] Sep 28  
13:25:02.638: Se0:3 LCP: State is Listen Sep 28 13:25:02.638: ISDN Se0:23: TX -> CALL\_PROC pd =  
8 callref = 0xD346 Sep 28 13:25:02.638: Channel ID i = 0xA98384 Sep 28 13:25:02.638: ISDN  
Se0:23: TX -> CONNECT pd = 8 callref = 0xD346 Sep 28 13:25:02.638: Channel ID i = 0xA98384 Sep  
28 13:25:02.658: ISDN Se0:23: RX <- CONNECT\_ACK pd = 8 callref = 0x5346 Sep 28 13:25:02.658:  
ISDN Se0:23: CALL\_PROGRESS: **CALL\_CONNECTED** call id 0x2B, bchan 3, dsl 0

*!--- Call is connected.* Sep 28 13:25:02.886: Se0:3 LCP: I CONFREQ [Listen] id 61 len 28 Sep  
28 13:25:02.886: Se0:3 LCP: MagicNumber 0x1EB88B1C (0x05061EB88B1C) Sep 28 13:25:02.886: Se0:3  
LCP: MRRU 1524 (0x110405F4) Sep 28 13:25:02.886: Se0:3 LCP: EndpointDisc 1 Local  
(0x130E0161757374696E5F6973646E) Sep 28 13:25:02.886: Se0:3 LCP: O CONFREQ [Listen] id 1 len 33  
Sep 28 13:25:02.886: Se0:3 LCP: AuthProto CHAP (0x0305C22305) Sep 28 13:25:02.886: Se0:3 LCP:  
MagicNumber 0x309AFABD (0x0506309AFABD) Sep 28 13:25:02.886: Se0:3 LCP: MRRU 1524 (0x110405F4)  
Sep 28 13:25:02.886: Se0:3 LCP: EndpointDisc 1 Local (0x130E016D6175692D6E61732D3032) Sep 28  
13:25:02.886: Se0:3 LCP: O CONFACK [Listen] id 61 len 28 Sep 28 13:25:02.886: Se0:3 LCP:  
MagicNumber 0x1EB88B1C (0x05061EB88B1C) Sep 28 13:25:02.886: Se0:3 LCP: MRRU 1524 (0x110405F4)  
Sep 28 13:25:02.886: Se0:3 LCP: EndpointDisc 1 Local (0x130E0161757374696E5F6973646E) Sep 28  
13:25:02.922: Se0:3 LCP: I CONFACK [ACKsent] id 1 len 33 Sep 28 13:25:02.922: Se0:3 LCP:  
AuthProto CHAP (0x0305C22305) Sep 28 13:25:02.922: Se0:3 LCP: MagicNumber 0x309AFABD  
(0x0506309AFABD) Sep 28 13:25:02.922: Se0:3 LCP: MRRU 1524 (0x110405F4) Sep 28 13:25:02.922:  
Se0:3 LCP: EndpointDisc 1 Local (0x130E016D6175692D6E61732D3032) Sep 28 13:25:02.922: Se0:3 **LCP:  
State is Open**

*!--- LCP negotiation is complete.* Sep 28 13:25:02.922: Se0:3 PPP: Phase is AUTHENTICATING,  
by this end [0 sess, 1 load] Sep 28 13:25:02.922: Se0:3 CHAP: O CHALLENGE id 1 len 32 from  
"maui-nas-02" Sep 28 13:25:02.954: Se0:3 CHAP: I RESPONSE id 1 len 32 from "austin\_isdn" Sep 28  
13:25:02.954: Se0:3 **CHAP: O SUCCESS** id 1 len 4

*!--- PPP CHAP authentication is successful.* Sep 28 13:25:02.958: Se0:3 PPP: Phase is  
VIRTUALIZED [0 sess, 1 load] Sep 28 13:25:02.958: Vi1 PPP: Phase is DOWN, Setup [0 sess, 1 load]  
Sep 28 13:25:02.982: Vi1 PPP: Phase is DOWN, Setup [0 sess, 1 load] Sep 28 13:25:02.982: Se0:3  
IPCP: Packet buffered while building MLP bundle interface Sep 28 13:25:02.986: %LINK-3-UPDOWN:  
**Interface Virtual-Access1,  
changed state to up**

*!--- Virtual-Access Interface is up. !--- This interface controls the incoming call.* Sep 28  
13:25:02.986: Vi1 PPP: Treating connection as a callin Sep 28 13:25:02.986: Vi1 PPP: Phase is  
ESTABLISHING, Passive Open [0 sess, 1 load] Sep 28 13:25:02.986: Vi1 LCP: State is Listen Sep 28  
13:25:02.986: Vi1 PPP: Phase is UP [0 sess, 1 load] Sep 28 13:25:02.986: Vi1 IPCP: O CONFREQ  
[Closed] id 1 len 10 Sep 28 13:25:02.986: Vi1 IPCP: Address 172.22.61.1 (0x0306AC163D01) Sep 28  
13:25:02.990: Vi1 MLP: Added first link Se0:3 to bundle austin\_isdn Sep 28 13:25:02.990: Vi1  
PPP: Pending ncpQ size is 1 Sep 28 13:25:02.990: Se0:3 IPCP: Redirect packet to Vi1 Sep 28  
13:25:02.990: Vi1 IPCP: I CONFREQ [REQsent] id 45 len 10 Sep 28 13:25:02.990: Vi1 IPCP: Address  
10.0.0.1 (0x03060A000001) Sep 28 13:25:02.990: Vi1 AAA/AUTHOR/IPCP: Start. Her address 10.0.0.1,  
we want 0.0.0.0 Sep 28 13:25:02.990: Vi1 AAA/AUTHOR/IPCP: Reject 10.0.0.1, using 0.0.0.0 Sep 28

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13:25:02.990: Vi1 AAA/AUTHOR/IPCP: Done. Her address 10.0.0.1, we want 0.0.0.0 Sep 28
13:25:02.990: Vi1 IPCP: O CONFNACK [REQsent] id 45 len 10 Sep 28 13:25:02.990: Vi1 IPCP: Address
172.22.61.2 (0x0306AC163D02)
  !--- Peer IP address is assigned from IP Pool named "ISDN". Sep 28 13:25:02.990: Se0:3
CDPCP: MLP bundle interface is built, process packets now Sep 28 13:25:02.990: Se0:3 CDPCP:
Redirect packet to Vi1 Sep 28 13:25:02.990: Vi1 CDPCP: I CONFREQ [Not negotiated] id 23 len 4
Sep 28 13:25:02.990: Vi1 LCP: O PROTREJ [Open] id 1 len 10 protocol CDPCP (0x820701170004) Sep
28 13:25:03.010: Vi1 IPCP: I CONFACK [REQsent] id 1 len 10 Sep 28 13:25:03.010: Vi1 IPCP:
Address 172.22.61.1 (0x0306AC163D01) Sep 28 13:25:03.010: Vi1 IPCP: I CONFREQ [ACKrcvd] id 46
len 4 Sep 28 13:25:03.010: Vi1 IPCP: O CONFACK [ACKrcvd] id 46 len 4 Sep 28 13:25:03.010: Vi1
IPCP: State is Open
  !--- IPCP negotiation is complete. The call is now connected. Sep 28 13:25:03.014: Di10
IPCP: Install route to 172.22.61.2 Sep 28 13:25:03.958: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Serial0:3, changed state to up Sep 28 13:25:03.986: %LINEPROTO-5-UPDOWN: Line protocol
on Interface Virtual-Access1, changed state to up Sep 28 13:25:04.146: ISDN Se0:23: RX <- SETUP
pd = 8 callref = 0x5409
  !--- The second link in the multilink connection arrives. Sep 28 13:25:04.150: Bearer
Capability i = 0x8890218F Sep 28 13:25:04.150: Channel ID i = 0xA18385 Sep 28 13:25:04.150:
Called Party Number i = 0xA1, '81560', Plan:ISDN, Type:National Sep 28 13:25:04.154: %LINK-3-
UPDOWN: Interface Serial0:4, changed state to up Sep 28 13:25:04.154: %ISDN-6-CONNECT: Interface
Serial0:3 is now connected to austin_isdn Sep 28 13:25:04.154: Se0:4 PPP: Treating connection as
a callin Sep 28 13:25:04.154: Se0:4 PPP: Phase is ESTABLISHING, Passive Open [0 sess, 1 load]
Sep 28 13:25:04.154: Se0:4 LCP: State is Listen Sep 28 13:25:04.158: ISDN Se0:23: TX ->
CALL_PROC pd = 8 callref = 0xD409 Sep 28 13:25:04.158: Channel ID i = 0xA98385 Sep 28
13:25:04.158: ISDN Se0:23: TX -> CONNECT pd = 8 callref = 0xD409 Sep 28 13:25:04.158: Channel ID
i = 0xA98385 Sep 28 13:25:04.178: ISDN Se0:23: RX <- CONNECT_ACK pd = 8 callref = 0x5409 Sep 28
13:25:04.178: ISDN Se0:23: CALL_PROGRESS: CALL_CONNECTED call id 0x2C, bchan 4, dsl 0 Sep 28
13:25:04.394: Se0:4 LCP: I CONFREQ [Listen] id 51 len 28 Sep 28 13:25:04.394: Se0:4 LCP:
MagicNumber 0x1EB8910D (0x05061EB8910D) Sep 28 13:25:04.394: Se0:4 LCP: MRRU 1524 (0x110405F4)
Sep 28 13:25:04.394: Se0:4 LCP: EndpointDisc 1 Local (0x130E0161757374696E5F6973646E) Sep 28
13:25:04.394: Se0:4 LCP: O CONFREQ [Listen] id 1 len 33 Sep 28 13:25:04.394: Se0:4 LCP:
AuthProto CHAP (0x0305C22305) Sep 28 13:25:04.394: Se0:4 LCP: MagicNumber 0x309B00A6
(0x0506309B00A6) Sep 28 13:25:04.394: Se0:4 LCP: MRRU 1524 (0x110405F4) Sep 28 13:25:04.394:
Se0:4 LCP: EndpointDisc 1 Local (0x130E016D6175692D6E61732D3032) Sep 28 13:25:04.394: Se0:4 LCP:
O CONFACK [Listen] id 51 len 28 Sep 28 13:25:04.394: Se0:4 LCP: MagicNumber 0x1EB8910D
(0x05061EB8910D) Sep 28 13:25:04.394: Se0:4 LCP: MRRU 1524 (0x110405F4) Sep 28 13:25:04.394:
Se0:4 LCP: EndpointDisc 1 Local (0x130E0161757374696E5F6973646E) Sep 28 13:25:04.430: Se0:4 LCP:
I CONFACK [ACKsent] id 1 len 33 Sep 28 13:25:04.430: Se0:4 LCP: AuthProto CHAP (0x0305C22305)
Sep 28 13:25:04.430: Se0:4 LCP: MagicNumber 0x309B00A6 (0x0506309B00A6) Sep 28 13:25:04.430:
Se0:4 LCP: MRRU 1524 (0x110405F4) Sep 28 13:25:04.430: Se0:4 LCP: EndpointDisc 1 Local
(0x130E016D6175692D6E61732D3032) Sep 28 13:25:04.430: Se0:4 LCP: State is Open Sep 28
13:25:04.430: Se0:4 PPP: Phase is AUTHENTICATING, by this end [0 sess, 1 load] Sep 28
13:25:04.430: Se0:4 CHAP: O CHALLENGE id 1 len 32 from "maui-nas-02" Sep 28 13:25:04.462: Se0:4
CHAP: I RESPONSE id 1 len 32 from "austin_isdn" Sep 28 13:25:04.466: Se0:4 CHAP: O SUCCESS id 1
len 4 Sep 28 13:25:04.466: Se0:4 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Sep 28 13:25:04.466:
Vi1 MLP: Added link Se0:4 to bundle austin_isdn
  !--- An additional Link is now added to exiting Virtual Interface Bundle. Sep 28
13:25:05.466: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:4, changed state to up Sep
28 13:25:10.154: %ISDN-6-CONNECT:
Interface Serial0:4 is now connected to austin_isdn
  !--- The second call is connected. The multilink Bundle is complete. maui-nas-02#

```

## 関連情報

- [ダイヤルとアクセステクノロジーのサポート ページ](#)
- [テクニカル サポートとドキュメント – Cisco Systems](#)