在相同的 T1/E1 PRI 电路上配置拨入与拨出

目录

简介

本文档介绍如何为同一T1 PRI上的传入和传出呼叫配置接入服务器。传入和传出呼叫均基于流量，使用按需拨号路由(DDR)，但不为任何其他路由器提供备份。如果希望配置仅用于拨入呼叫的接入服务器，请参阅文档<u>为传入异步和ISDN呼叫<u>配置带PRI的接入服务器</u></u>。要调整此配置以包括备份，请参阅文档<u>配置和排除DDR备份故障</u>。

先决条件

要求

第1步 — 配置并验证拨入和拨出客户端设置正确。由于此配置侧重于中心站点NAS配置，因此我们不包括客户端的示例配置。以下包含一些客户端示例配置：

拨入客户端 — 拨入NAS的设备：

- 带拨号程序配置文件的BRI:<u>为传入异步和ISDN呼叫<u>配置带PRI的接入服务器</u></u> — 使用文档中提供的客户端1600系列路由器（主机名maui-soho-01）配置。
- 带拨号器映射的BRI:<u>使用DDR拨号器映射配置BRI到BRI拨号</u> — 使用文档中提供的客户端1600系列路由器（主机名maui-soho-01）配置
- PRI：<u>AS5300使用ISDN/异步拨出（出站DDR）</u> — 使用中心站点AS5300（主机名称为5300）配置。该文档显示接入服务器上的出站DDR，这使其适合作为本文档中的拨入客户端。

拨出客户端 — 此NAS拨出到的设备：

- 带拨号程序配置文件的BRI:使用拨号程序配置文件配置ISDN DDR — 使用文档中提供的中心站点3640系列路由器（主机名maui-nas-04）配置
- 带拨号器映射的BRI:使用DDR拨号器映射配置BRI到BRI拨号 — 使用文档中提供的中心站点3640系列路由器（主机名maui-nas-05）配置
- PRI：为传入异步和ISDN呼叫配置带PRI的接入服务器 — 使用文档中提供的中心站点AS5300系列路由器（主机名maui-nas-02）配置。如果NAS拨出到的设备是另一台具有T1/E1 PRI电路的接入服务器，则将该设备配置为接受拨入呼叫的常规接入服务器。

第 2 步 - 确认电话公司电路正常工作。您可以使用show isdn status命令来检验BRI或PRI电路是否正常工作。请参阅文档使用 show isdn status 命令进行 BRI 故障排除以获得详细信息。您必须同时启用用于出站呼叫的 T1/E1 PRI电路。请与电话公司联系以验证此信息。

使用的组件

此配置使用下面软件和硬件版本开发并且被测试。

- NAS:Cisco AS5300，带一个T1 PRI电路。此AS5300运行Cisco IOS软件版本12.2(5)。
- 客户端：Cisco AS5300，带一个T1 PRI电路。此配置不包括在内。
- 客户端：Cisco 1600，带一个BRI电路。此配置不包括在内。
- 客户端：Cisco 804，带一个BRI电路。此配置不包括在内。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

背景理论

在许多情况下，可能需要使用相同的T1/E1 PRI电路进行拨入和拨出连接。网络接入服务器(NAS)将支持来自多个ISDN用户的呼入，并且还可以在同一PRI上向另一设备发出呼出呼叫。出站拨号也可用于备份场景，在备份场景中，NAS会拨号并连接到失去其主广域网链路的对等体。

相关产品

此配置可用于任何具有 T1 或 PRI 卡的路由器。因此，任何具有 T1 或 PRI 卡的 AS5xxx 系列路由器都能使用此配置。Cisco 2600和3600系列路由器也可配置为使用T1/PRI广域网接口卡(WIC)或网络模块接受ISDN呼叫。

也可以修改该配置，与E1或PRI端口结合使用。为E1控制器配置Telco提供的线性编码、成帧及其他物理特性。D信道配置(E1的接口串行x:15)和这里显示的类似。
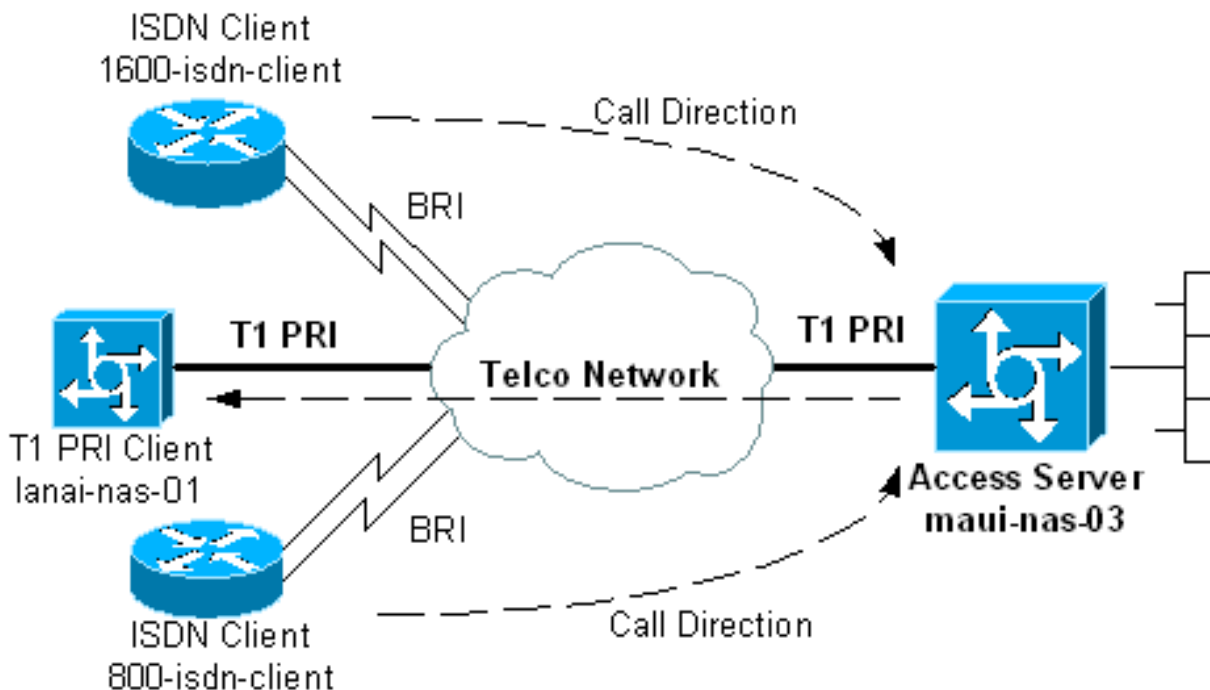
规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

配置

本部分提供有关如何配置本文档所述功能的信息。

注意：要查找有关本文档中使用的命令的其他信息，请使用IOS命令查找工具

网络图

本文档使用下图所示的网络设置。

配置

配置接入服务器以在同一T1/E1 PRI上发出传出呼叫和接受传入呼叫有两种主要方法。这些是拨号程序配置文件和拨号程序旋转组。每种方法都有其优点和缺点，例如：

- 拨号器旋转组的配置和管理更简单。
- 拨号程序配置文件需要为每个传入和传出呼叫提供单独的拨号程序接口。如果您有许多传入和传出对等体，则创建和维护配置将会非常复杂。
- 拨号程序配置文件允许进行客户端特定配置。例如，您可以指定某个客户端将从地址池A分配IP地址，而另一个客户端将从地址池B分配地址。
- 拨号器旋转组只允许将相同的参数应用于所有用户。无法按用户自定义。
- 拨号器循环组仅允许传入和传出呼叫的单个相关流量定义。因此，不能将路由器配置为对传入呼叫使用一个相关流量定义，对传出呼叫使用另一个相关流量定义。
- 拨号程序配置文件允许为每个对等体单独定义相关流量。

本文档提供使用NAS上的拨号程序配置文件和拨号程序旋转组的示例。选择适合您情况的方法。

带拨号程序配置文件的中央接入服务器(AS5300)

```
maui-nas-03#show running-config
Building configuration...

Current configuration : 3351 bytes
!
! Last configuration change at 07:25:39 CDT Wed Oct 24
2001
! NVRAM config last updated at 16:37:00 CDT Tue Oct 23
2001
!
```

```
version 12.2
service timestamps debug datetime msec show-timezone
service timestamps log datetime msec show-timezone
service password-encryption
!
hostname maui-nas-03
!
aaa new-model
aaa authentication login default local
aaa authentication login NO_AUTHEN none
aaa authentication ppp default local
aaa authorization network default local
enable secret 5 <deleted>
!
username admin password 7 <deleted>
username 800-isdn-client password 7 <deleted>
username 1600-isdn-client password 7 <deleted>
username 5300-client password 7 <deleted>
username lanai-nas-01 password 7 <deleted>
 ! -- Usernames for local authentication of the call. !
-- The client presents the username/password ! -- and
the NAS authenticates the peer. spe 2/0 2/7 firmware
location mica-modem-pw.2.7.3.0.bin ! resource-pool
disable ! clock timezone CST -6 clock summer-time CDT
recurring ip subnet-zero ! isdn switch-type primary-ni !
-- Switch-type for this NAS. Obtain this information
from the Telco. isdn voice-call-failure 0 ! 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 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 will now automatically create
the ! -- corresponding D-channel: interface Serial 0:23
! ! -- The configurations for unused T1 controllers are
omitted to save space. ! -- Unused T1s can be shutdown.


!
interface Ethernet0
 ip address 172.22.53.150 255.255.255.0
!
interface Serial0:23
! -- D-channel configuration for T1 0. no ip address
encapsulation ppp dialer pool-member 10 ! -- Assign this
D-channel as member of dialer pool 10. ! -- Dialer pool
10 is used by interface Dialer 1 and Dialer 2. ! -- All
Dialer Interfaces for incoming calls should be
configured ! -- to use this pool. dialer pool-member 50
max-link 10 ! -- The D-channel is also a member of
dialer pool 50. ! -- Dialer pool 50 is used by interface
Dialer 100. ! -- The pool can use a maximum of 10 links
and will be used for outgoing calls. isdn switch-type
primary-ni isdn bchan-number-order ascending ! -- B
Channel Outgoing Call Order is ascending. ! -- Contact
the Telco to determine whether the ISDN outbound trunk !
-- call selection is configured for ascending or
descending on the switch. no cdp enable ppp
authentication chap ppp multilink ! -- Allow multilink
ppp on this interface. ! interface FastEthernet0 no ip
```

```
address shutdown duplex auto speed auto ! interface
Dialer1 description For Dialin ISDN Client - austin-
soho-01 ip unnumbered Ethernet0
```
! -- The interface is unnumbered to conserve IP addresses.
```
encapsulation ppp dialer pool 10
```
! -- Defines the pool of physical resources from which the Dialer ! -- interface may draw B channels as needed. Interface Dialer 2 also ! -- uses this pool. Serial 0:23 is a member of this pool.
```
dialer remote-name 1600-isdn-client
```
! -- Specifies remote router authenticated name and must match that used by ! -- the remote router to authenticate itself (which can be different from ! -- the router hostname). The router uses this remote-name to bind the ! -- incoming call to this dialer. without this command calls from ! -- 1600-isdn-client will fail after authentication.
```
dialer idle-timeout 0
```
! -- Set an idle-timeout of infinity. ! -- The "zero" option for **dialer idle-timeout** *was introduced in 12.1(3)T.*

```
 dialer-group 1
```
! -- Apply interesting traffic definition from **dialer-list 1.**

```
 peer default ip address pool DIALIN
```
! -- Clients are assigned addresses from the ip address pool named "DIALIN".
```
no fair-queue ppp authentication
chap callin ppp multilink ! interface Dialer2
description For Dialin ISDN Client - travis-soho-01 ip
unnumbered Ethernet0 encapsulation ppp dialer pool 10
```
! -- Defines the pool of physical resources from which the Dialer ! -- interface may draw B channels as needed. Interface Dialer 1 ! -- also uses this pool. Serial 0:23 is a member of this pool.
```
dialer remote-name 800-isdn-
client
```
! -- Binds incoming calls from user "800-isdn-client" to this dialer.
```
dialer-group 1
```
! -- Apply interesting traffic definition from **dialer-list 1.**

```
 peer default ip address pool DIALIN
 pulse-time 0
 ppp authentication chap callin
 ppp multilink
!
interface Dialer100
 description For Dialout Client - lanai-nas-01
 ip unnumbered Ethernet0
 encapsulation ppp
 dialer pool 50
```
! -- This dialer will draw resources from dialer pool 50 ! -- in which int serial 0:23 is the sole member. ! -- Since this dialer is used for dialout, ! -- the outgoing call will be sent to interface se 0:23.
```
dialer remote-
name lanai-nas-01
```
! -- Specifies remote router authenticated name and must match that used by ! -- the remote router to authenticate itself ! -- (which can be different from the router hostname).
```
dialer idle-timeout
900
```
! -- Idle timeout for incoming calls is 900 seconds (15 mins). ! -- Users that are idle for more than 900 seconds will be dropped.
```
dialer string 81690 class 56k
```
!--- Dial 81690 and use the map-class named "56k" (defined below).
```
dialer load-threshold 1 outbound
```
! -- This sets the outbound load level for traffic at which ! -- additional connections will be added to the MP bundle load level. ! -- Values range from 1 (unloaded) to 255 (fully loaded). ! -- With a threshold of 1, additional

```
links will be immediately ! -- brought up and added to
the bundle. dialer-group 3 ! -- Apply interesting
traffic definition from dialer-list 3. ! -- Note: the
interesting traffic definition for outbound ! -- calls
is different than for incoming calls.

 ppp authentication chap
 ppp multilink
! -- Allow multlink ppp. ! router eigrp 69 network
172.22.0.0 auto-summary no eigrp log-neighbor-changes !
ip local pool DIALIN 172.22.53.151 172.22.53.159 ! -- IP
address pools for dialin clients. ip classless ip route
172.16.0.0 255.255.0.0 Dialer100 ! -- Static route for
the 172.16.0.0/16 network. ! -- Interesting Traffic for
that network ! -- will be sent to interface Dialer100
and the router ! -- will initiate the outbound call. no
ip http server ip pim bidir-enable ! ! map-class dialer
56k !-- map-class named "56k" that was used with the
dialer string in int Dialer100. dialer isdn speed 56 ! -
- Set the speed of the call to be 56k (default is 64k).
! -- This may not be neccessary 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 definition for dialin clients
access-list 101 deny eigrp any any access-list 101 deny
udp any any eq ntp access-list 101 permit ip any any ! -
- EIGRP and NTP traffic are tagged uninteresting for
dialin clients. access-list 103 remark Interesting
traffic for link lanai-nas-01 access-list 103 deny eigrp
any any access-list 103 deny udp any any eq ntp access-
list 103 permit ip any any ! -- EIGRP and NTP traffic
are tagged uninteresting for the outbound dial. ! --
Eventhough the two interesting traffic definitions here
are identical, ! -- they can be changed depending on
your traffic patterns. dialer-list 1 protocol ip list
101 !--- Interesting traffic is defined by access-list
101. !--- This is applied to interface Dialer 1 & 2
using the command dialer-group 1. !--- Note: The
specified dialer-list number must be the same !--- as
the dialer-group number; in this example, defined to be
"1".

dialer-list 3 protocol ip list 103
!
line con 0
 exec-timeout 0 0
 login authentication NO_AUTHEN
line 1 48
line aux 0
line vty 0 4
!
ntp clock-period 17180029
ntp server 172.22.53.1
end
```

上述拨号程序配置文件配置为每个传入和传出呼叫都有一个单独的拨号程序接口。传入呼叫的拨号器接口是Dialer 1和Dialer 2，而传出呼叫的拨号器接口是Dialer100。在传入呼叫经过身份验证后，路由器根据dialer remote-name将呼叫绑定到相应的拨号器接口。只有外发呼叫的拨号器接口（拨号器100）具有拨号器字符串，其中包含要拨打的号码。只有Dialer100包含dialer load-threshold命令，因为它可以根据入站或出站负载（默认为出站）拨打附加链路。

以下配置对此场景使用拨号器旋转组：

带旋转组的中央接入服务器

```
maui-nas-03#show running-config
Building configuration...

Current configuration : 2436 bytes
!
! Last configuration change at 08:20:11 CDT Thu Oct 25
2001
!
version 12.2
service timestamps debug uptime
service timestamps log uptime
service password-encryption
!
hostname maui-nas-03
!
aaa new-model
aaa authentication login default local
aaa authentication login NO_AUTHEN none
aaa authentication ppp default local
aaa authorization network default local
enable secret 5 <deleted>
!
username admin password 7 <deleted>
username lanai-nas-01 password 7 <deleted>
username 800-isdn-client password 7 <deleted>
username 1600-isdn-client password 7 <deleted>
spe 2/0 2/7
 firmware location mica-modem-pw.2.7.3.0.bin
!
resource-pool disable
!
clock timezone CST -6
clock summer-time CDT recurring
ip subnet-zero
!
isdn switch-type primary-ni
!
controller T1 0
 framing esf
 clock source line primary
 linecode b8zs
 pri-group timeslots 1-24
!
 ! -- The configuration for unused T1 controllers are
omitted to save space. ! -- Unused T1s can be shutdown.


!
interface Ethernet0
 ip address 172.22.53.150 255.255.255.0
!
interface Serial0:23
! -- D-channel configuration for T1 0. no ip address
encapsulation ppp dialer rotary-group 1 ! -- T1 0 is a
member of rotary group 1. ! -- The rotary group
configuration is in interface Dialer 1. ! -- Note: this
command was not included in the dialer profile
configuration.

 isdn switch-type primary-ni
 isdn bchan-number-order ascending
 no peer default ip address
```

```
 no cdp enable
 ppp authentication chap
 ppp multilink
!
interface FastEthernet0
 no ip address
 shutdown
 duplex auto
 speed auto
!
interface Dialer1
```
!--- Configuration for rotary group 1. !--- The Dialer interface number (1) must exactly match rotary group number !--- configured on the physical interfaces(interface Serial 0:23). `ip unnumbered Ethernet0` *! -- This dialer is unnumbered to ethernet 0.* `encapsulation ppp dialer in-band` *! -- Enable this dialer interface to be a DDR interface.* `dialer idle-timeout 900` *! -- Idle timeout for incoming calls is 900 seconds (15 mins). ! -- Users that are idle for more than 900 seconds will be dropped. ! -- If* **dialer in-band** is used and a **dialer idle-timeout** is not defined, then ! -- the default idle-timeout of 120 seconds (2min) will be applied.

 `dialer map ip 172.16.1.1 name lanai-nas-01 speed 56 broadcast 81690`
! -- Dialer map for the outbound dial. Add a dialer map for every router ! -- that needs to be dialed. Inbound calls do not need dialer maps. ! -- They will be dynmamically created. `dialer load-threshold 1 outbound` *! -- This sets the outbound load level for Multlink PPP at 1/255.* `dialer-group 1` *!--- Apply interesting traffic definition from dialer-list 1.* ! -- **Note**: The specified **dialer-group** number must be the same as ! -- the **dialer-list number**; in this example, defined to be "1".

 `peer default ip address pool DIALIN`
 ! -- clients are assigned addresses from the ip address pool named "DIALIN". `no cdp enable ppp authentication chap ppp multilink multilink max-links 5 ! router eigrp 69 network 172.22.0.0 auto-summary no eigrp log-neighbor-changes ! ip local pool DIALIN 172.22.53.151 172.22.53.159 ip classless ip route 172.16.0.0 255.255.0.0 172.16.1.1 ip route 172.16.1.1 255.255.255.255 Dialer1 no ip http server ip pim bidir-enable ! ! access-list 101 remark Interesting traffic definition access-list 101 deny eigrp any any access-list 101 deny udp any any eq ntp access-list 101 permit ip any any dialer-list 1 protocol ip list 101* *! -- Interesting traffic is defined by* **dialer-list** 1. ! -- This is applied to interface Dialer 1 using dialer-group 1. ! -- The interesting traffic definition for inbound and outbound calls ! -- is the same. If you want different interesting traffic definition ! -- for inbound and outbound calls use dialer profiles.

```
!
line con 0
 login authentication NO_AUTHEN
line 1 48
line aux 0
line vty 0 4
!
```

```
ntp clock-period 17179882
ntp server 172.22.53.1
end
```

在上述拨号器旋转组配置中，拨号器接口有一个用于拨出的拨号器映射。为每个需要拨号的对等体配置拨号器映射。

注意：传入呼叫不需要拨号器映射，因为它们是动态创建的。这可以使用命令show dialer map**进行验证。**示例如下所示：

```
maui-nas-03#show dialer map
Dynamic dialer map ip 172.22.53.152 name 1600-isdn-client () on Di1
! -- Dynamic dialer map for 1600-isdn-cliet created from Dialer1 ! -- (the rotary group
interface). Dynamic dialer map ip 172.22.53.151 name 800-isdn-client () on Di1 ! -- Dynamic
dialer map for 800-isdn-cliet created from Dialer1 ! -- (the rotary group interface). Static
dialer map ip 172.16.1.1 name lanai-nas-01 (81690) on Di1 ! -- Static map configured on Dialer 1
was applied to this link ! -- connected to lanai-nas-01.
```

验证

本部分所提供的信息可用于确认您的配置是否正常工作。

输出解释器工具支持某些 show 命令（只限于注册用户），通过它可以查看 show 命令输出的分析。

- **show isdn status - 确保路由器与 ISDN 交换机正常通信。**在输出中，验证第1层状态是否为活跃状态，是否第2层状态=MULTIPLE_FRAME_ESTABLISHED出现。此指令也显示活动的呼叫的数量。
- **show ppp multilink - 显示关于处于活动状态的多链路捆绑的信息。**应使用本命令来检查多链路连接。
- **show dialer [interface type number] - 显示为 DDR 配置的接口的常规诊断信息。**如果拨号程序正常启动，则应出现 `Dialer state is data link layer up` 如果`physical layer up(NCP)`启动拨号的数据包的源地址和目标地址显示在 Dial reason line 中。**此show指令也显示计时器的配置和连接超时前的时间。**
- **show caller user username detail -**显示特定用户参数，如分配的IP地址、PPP和PPP捆绑参数等。如果您的Cisco IOS版本软件不支持此指令，请使用**show users命令。**
- **show dialer map - 显示已配置的动态和静态 Dialer Maps。**此指令可以被用于发现动态拨号映射是否被创建了。没有dialer map，您不能路由数据包。

以下是确保成功呼叫的一些显示命令输出。注意在输出和备注中的粗体部分。比较您得到与如下所示的结果的输出。

```
maui-nas-03#show isdn status
Global ISDN Switchtype = primary-ni
ISDN Serial0:23 interface
        dsl 0, interface ISDN Switchtype = primary-ni
    Layer 1 Status:
        ACTIVE
    Layer 2 Status:
        TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
! -- Layer 1 is ACTIVE and Layer 2 is MULTIPLE FRAME ESTABLISHED. Layer 3 Status: 0 Active Layer
3 Call(s) Active dsl 0 CCBs = 0 The Free Channel Mask: 0x807FFFFF Number of L2 Discards = 0, L2
Session ID = 0 Total Allocated ISDN CCBs = 0 maui-nas-03#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 0 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 2
```
! -- All channels are Inservice. maui-nas-03#**show user**
```
   Line       User       Host(s)              Idle       Location
*  0 con 0                idle                 00:00:00

  Interface    User       Mode                         Idle     Peer Address
  Di100        lanai-nas- PPP  Bundle         00:00:35 172.16.1.1
```
! -- Connection to lanai-nas-01 uses int Dialer 100. **Di2**   **800-isdn**-c PPP   Bundle 00:00:22 172.22.53.154

! -- Connection to 800-isdn-client uses int Dialer 2. **Di1**   **1600-isdn**- PPP   Bundle 00:01:29 172.22.53.153

! -- Connection to 1600-isdn-client uses int Dialer 1. Se0:0 lanai-nas- Sync PPP - Bundle: Di100 Se0:1 lanai-nas- Sync PPP - Bundle: Di100 Se0:2 1600-isdn- Sync PPP - Bundle: Di1 Se0:3 1600-isdn- Sync PPP - Bundle: Di1 Se0:4 lanai-nas- Sync PPP - Bundle: Di100 Se0:5 lanai-nas- Sync PPP - Bundle: Di100 Se0:6 lanai-nas- Sync PPP - Bundle: Di100 Se0:7 800-isdn-c Sync PPP - Bundle: Di2 Se0:8 800-isdn-c Sync PPP - Bundle: Di2 *! -- Two B-channels are connected to 800-isdn-client (Se0:7-Se0:8) and ! -- 1600-isdn-client (Se0:2-Se0:3). Five other B-channels ! -- (Se0:0-Se0:1 and Se0:4-Se0:6) are connected to lanai-nas-01.* maui-nas-03#**show ppp multilink**

Dialer2, bundle name is 800-isdn-client
! -- int Dialer 2 controls multilink bundle to 800-isdn-client. Bundle up for never 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load 0x8 received sequence, 0xC sent sequence Member links: 2 (max not set, min not set) **Serial0:7**, since 00:00:16, last rcvd seq 000006
    Serial0:8, since 00:00:15, last rcvd seq 000007
! -- B-channels Se0:7 and Se0:8 are connected. **Dialer100, bundle name is lanai-nas-01**
! -- int Dialer 100 controls multilink bundle to lanai-nas-01. Bundle up for never 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load 0x33 received sequence, 0x33 sent sequence Member links: 5 (max not set, min not set) **Serial0:0**, since 00:02:08, last rcvd seq 000032
    Serial0:1, since 00:02:05, last rcvd seq 00002E
    Serial0:4, since 00:01:35, last rcvd seq 00002F
    Serial0:5, since 00:01:05, last rcvd seq 000030
    Serial0:6, since 00:00:35, last rcvd seq 000031
! -- B-channels Se0:0-Se0:1 and Se0:4-Se0:6 are connected. **Dialer1, bundle name is 1600-isdn-client**
! -- int Dialer 100 controls multilink bundle to 1600-isdn-client. Bundle up for never 0 lost fragments, 1 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load 0x28 received sequence, 0x7B sent sequence Member links: 2 (max not set, min not set) **Serial0:2**, since 00:06:24, last rcvd seq 000026
    Serial0:3, since 00:06:22, last rcvd seq 000027
! -- B-channels Se0:2 and Se0:3 are connected.

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除资源

按照需要使用下列故障排除资源：

- 传入ISDN呼叫故障排除 — 用于ISDN呼叫故障排除。

- [PRI ISDN呼叫](#) — 有关排除ISDN呼叫故障的其他信息。
- [T1故障排除流程图](#) — 如果您怀疑T1电路工作不正常，请使用此流程图。
- [T1 PRI故障排除](#)- ISDN PRI电路的故障排除过程。
- [T1/56K线路的环回测试](#) — 检验路由器上的T1端口是否正常运行。
- [使用 show isdn status 命令进行 BRI 故障排除 - 使用本文档进行 BRI 故障排除。](#)
- [使用debug isdn q931命令排除ISDN BRI第3层故障](#) — 使用本文档ISDN第3层故障排除。

故障排除命令

输出解释器工具支持某些 show 命令（只限于注册用户），通过它可以查看 show 命令输出的分析。

注意：在发出debug**命令之前，请参**[阅有关Debug命令的重要信息](#)。

- debug dialer -关于在拨号接口收到数据包的显示DDR调试信息。此信息有助于保证具有可以使用拨号程序接口的触发数据流。
- debug isdn q931 -显示呼叫建立和拆卸ISDN网络连接(第3层)。
- debug ppp negotiation -显示协商链路控制协议(LCP)、认证和网络控制协议(NCP)时的 PPP数据流量和交换的信息。成功的PPP协商将首先开放LCP状态，然后进行验证，最后进行NCP协商。在 LCP 协商期间建立多链路参数，如最大接收重建单元 (MRRU)。
- debug ppp authentication - 显示 PPP 认证协议消息，包括 CHAP 数据包交换和口令身份验证协议 (PAP) 交换。
- debug ppp error -显示与PPP连接协商和运行有关的协议错误和错误统计数据。

以下是成功传出呼叫的调试输出。注意在输出和备注中的粗体部分。比较您得到与如下所示的结果的输出。

```
maui-nas-03#debug dialer
Dial on demand events debugging is on
maui-nas-03#debug ppp negotiation
PPP protocol negotiation debugging is on
maui-nas-03#debug ppp authentication
PPP authentication debugging is on
maui-nas-03#debug isdn q931
ISDN Q931 packets debugging is on

maui-nas-03#ping 172.16.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.1.1, timeout is 2 seconds:

Oct 24 12:56:16.205 UTC: Se0:23 DDR: rotor dialout [priority]
Oct 24 12:56:16.205 UTC: Se0:23 DDR: Dialing cause ip
(s=172.22.53.150, d=172.16.1.1)
```
! -- The dialing cause is a ping for 172.16.1.1. ! -- ICMP is tagged as interesting. Oct 24
12:56:16.205 UTC: Se0:23 DDR: Attempting to dial 81690 Oct 24 12:56:16.205 UTC: ISDN Se0:23: **TX
-> SETUP** pd = 8 callref = 0x0063
! -- Outgoing ISDN Q.931 SETUP message. Oct 24 12:56:16.205 UTC: Bearer Capability i =
0x8890218F Oct 24 12:56:16.205 UTC: Channel ID i = 0xA98381 Oct 24 12:56:16.209 UTC: Called
Party Number i = 0x80, '81690', Plan:Unknown, Type:Unknown Oct 24 12:56:16.241 UTC: ISDN Se0:23:
RX <- CALL_PROC pd = 8 callref = 0x8063 Oct 24 12:56:16.241 UTC: Channel ID i = 0xA98381 Oct 24
12:56:16.285 UTC: ISDN Se0:23: **RX <- CONNECT** pd = 8 callref = 0x8063
! -- Received Q.931 CONNECT message. Oct 24 12:56:16.297 UTC: %LINK-3-UPDOWN: Interface
Serial0:0, changed state to up Oct 24 12:56:16.297 UTC: Se0:0: interface must be fifo queue,
force fifo Oct 24 12:56:16.297 UTC: %DIALER-6-BIND: Interface Se0:0 bound to profile Di100 Oct

24 12:56:16.297 UTC: Se0:0 PPP: Treating connection as a callout Oct 24 12:56:16.297 UTC: Se0:0 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load] Oct 24 12:56:16.301 UTC: Se0:0 LCP: O CONFREQ [Closed] id 12 len 33 Oct 24 12:56:16.301 UTC: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:16.301 UTC: Se0:0 LCP: MagicNumber 0xE384A4CD (0x0506E384A4CD) Oct 24 12:56:16.301 UTC: Se0:0 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:16.301 UTC: Se0:0 LCP: EndpointDisc 1 maui-nas-03 (0x130E016D6175692D6E61732D3033) Oct 24 12:56:16.301 UTC: ISDN Se0:23: TX -> CONNECT_ACK pd = 8 callref = 0x0063 Oct 24 12:56:16.317 UTC: Se0:0 LCP: I CONFREQ [REQsent] id 10 len 34 Oct 24 12:56:16.317 UTC: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:16.317 UTC: Se0:0 LCP: MagicNumber 0x54F49B93 (0x050654F49B93) Oct 24 12:56:16.321 UTC: Se0:0 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:16.321 UTC: Se0:0 LCP: EndpointDisc 1 lanai-nas-01 (0x130F016C616E61692D6E61732D3031) Oct 24 12:56:16.321 UTC: Se0:0 LCP: O CONFACK [REQsent] id 10 len 34 Oct 24 12:56:16.321 UTC: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:16.321 UTC: Se0:0 LCP: MagicNumber 0x54F49B93 (0x050654F49B93) Oct 24 12:56:16.321 UTC: Se0:0 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:16.321 UTC: Se0:0 LCP: EndpointDisc 1 lanai-nas-01 (0x130F016C616E61692D6E61732D3031) Oct 24 12:56:16.325 UTC: Se0:0 LCP: I CONFACK [ACKsent] id 12 len 33 Oct 24 12:56:16.325 UTC: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:16.325 UTC: Se0:0 LCP: MagicNumber 0xE384A4CD (0x0506E384A4CD) Oct 24 12:56:16.325 UTC: Se0:0 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:16.325 UTC: Se0:0 LCP: EndpointDisc 1 maui-nas-03 (0x130E016D6175692D6E61732D3033) Oct 24 12:56:16.325 UTC: Se0:0 **LCP: State is Open**
! -- LCP negotiation is complete. Oct 24 12:56:16.325 UTC: Se0:0 PPP: Phase is AUTHENTICATING, by both [0 sess, 1 load] Oct 24 12:56:16.325 UTC: Se0:0 CHAP: O CHALLENGE id 8 len 32 from "maui-nas-03" Oct 24 12:56:16.337 UTC: Se0:0 CHAP: I CHALLENGE id 10 len 33 from "lanai-nas-01" Oct 24 12:56:16.341 UTC: Se0:0 CHAP: O RESPONSE id 10 len 32 from "maui-nas-03" Oct 24 12:56:16.353 UTC: Se0:0 **CHAP: I SUCCESS** id 10 len 4
Oct 24 12:56:16.357 UTC: Se0:0 CHAP: I RESPONSE id 8 len 33 from "lanai-nas-01"
Oct 24 12:56:16.361 UTC: Se0:0 **CHAP: O SUCCESS** id 8 len 4
! -- Two-way CHAP authentication is successful. Oct 24 12:56:16.361 UTC: Se0:0 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Oct 24 12:56:16.361 UTC: Di100 DDR: Authenticated host lanai-nas-01 with no matching dialer map Oct 24 12:56:16.361 UTC: Di100 PPP: Phase is UP [0 sess, 1 load] Oct 24 12:56:16.361 UTC: Di100 IPCP: O CONFREQ [Closed] id 6 len 10 Oct 24 12:56:16.361 UTC: Di100 IPCP: Address 172.22.53.150 (0x0306AC163596) Oct 24 12:56:16.361 UTC: Di100 CDPCP: O CONFREQ [Closed] id 6 len 4 Oct 24 12:56:16.365 UTC: Di100 MLP: Added first link Se0:0 to bundle lanai-nas-01 Oct 24 12:56:16.365 UTC: Di100 PPP: Treating connection as a callout Oct 24 12:56:16.377 UTC: Di100 IPCP: I CONFREQ [REQsent] id 1 len 10 Oct 24 12:56:16.377 UTC: Di100 IPCP: Address 172.16.1.1 (0x0306AC100101) Oct 24 12:56:16.377 UTC: Di100 IPCP: O CONFACK [REQsent] id 1 len 10 Oct 24 12:56:16.377 UTC: Di100 IPCP: Address 172.16.1.1 (0x0306AC100101) Oct 24 12:56:16.381 UTC: Di100 IPCP: I CONFACK [ACKsent] id 6 len 10 Oct 24 12:56:16.381 UTC: Di100 IPCP: Address 172.22.53.150 (0x0306AC163596) Oct 24 12:56:16.381 UTC: Di100 IPCP: State is Open Oct 24 12:56:16.381 UTC: Di100 DDR: dialer protocol up Oct 24 12:56:16.381 UTC: **Di100 IPCP: Install route to 172.16.1.1**
! -- A route to the peer is installed. Oct 24 12:56:17.361 UTC: **%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:0,**
changed state to up
Oct 24 12:56:19.113 UTC: **Se0:23 DDR: rotor dialout [priority]**
! -- Second call is being dialed. Oct 24 12:56:19.113 UTC: Se0:23 DDR: Attempting to dial 81690 Oct 24 12:56:19.113 UTC: ISDN Se0:23: TX -> SETUP pd = 8 callref = 0x0064 Oct 24 12:56:19.113 UTC: Bearer Capability i = 0x8890218F Oct 24 12:56:19.113 UTC: Channel ID i = 0xA98382 Oct 24 12:56:19.113 UTC: Called Party Number i = 0x80, '81690', Plan:Unknown, Type:Unknown Oct 24 12:56:19.141 UTC: ISDN Se0:23: RX <- CALL_PROC pd = 8 callref = 0x8064 Oct 24 12:56:19.141 UTC: Channel ID i = 0xA98382 Oct 24 12:56:19.205 UTC: ISDN Se0:23: RX <- CONNECT pd = 8 callref = 0x8064 Oct 24 12:56:19.217 UTC: %LINK-3-UPDOWN: Interface Serial0:1, changed state to up Oct 24 12:56:19.217 UTC: Se0:1: interface must be fifo queue, force fifo Oct 24 12:56:19.217 UTC: %DIALER-6-BIND: Interface Se0:1 bound to profile Di100 Oct 24 12:56:19.217 UTC: %ISDN-6-CONNECT: Interface Serial0:0 is now connected to 81690 lanai-nas-01 Oct 24 12:56:19.221 UTC: Se0:1 PPP: Treating connection as a callout Oct 24 12:56:19.221 UTC: Se0:1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load] Oct 24 12:56:19.221 UTC: Se0:1 LCP: O CONFREQ [Closed] id 14 len 33 Oct 24 12:56:19.221 UTC: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:19.221 UTC: Se0:1 LCP: MagicNumber 0xE384B037 (0x0506E384B037) Oct 24 12:56:19.221 UTC: Se0:1 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:19.221 UTC: Se0:1 LCP: EndpointDisc 1 maui-nas-03 (0x130E016D6175692D6E61732D3033) Oct 24 12:56:19.221 UTC: ISDN Se0:23: TX -> CONNECT_ACK pd = 8 callref = 0x0064 Oct 24 12:56:19.241 UTC: Se0:1 LCP: I CONFREQ [REQsent] id 11 len 34 Oct 24 12:56:19.241 UTC: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:19.241 UTC: Se0:1 LCP: MagicNumber 0x54F4A700 (0x050654F4A700) Oct 24 12:56:19.241 UTC: Se0:1 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:19.241 UTC: Se0:1 LCP: EndpointDisc 1 lanai-nas-01

(0x130F016C616E61692D6E61732D3031) Oct 24 12:56:19.241 UTC: Se0:1 LCP: O CONFACK [REQsent] id 11 len 34 Oct 24 12:56:19.241 UTC: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:19.241 UTC: Se0:1 LCP: MagicNumber 0x54F4A700 (0x050654F4A700) Oct 24 12:56:19.241 UTC: Se0:1 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:19.241 UTC: Se0:1 LCP: EndpointDisc 1 lanai-nas-01 (0x130F016C616E61692D6E61732D3031) Oct 24 12:56:19.245 UTC: Se0:1 LCP: I CONFACK [ACKsent] id 14 len 33 Oct 24 12:56:19.245 UTC: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Oct 24 12:56:19.245 UTC: Se0:1 LCP: MagicNumber 0xE384B037 (0x0506E384B037) Oct 24 12:56:19.245 UTC: Se0:1 LCP: MRRU 1524 (0x110405F4) Oct 24 12:56:19.245 UTC: Se0:1 LCP: EndpointDisc 1 maui-nas-03 (0x130E016D6175692D6E61732D3033) Oct 24 12:56:19.245 UTC: Se0:1 LCP: State is Open Oct 24 12:56:19.245 UTC: Se0:1 PPP: Phase is AUTHENTICATING, by both [0 sess, 1 load] Oct 24 12:56:19.245 UTC: Se0:1 CHAP: O CHALLENGE id 8 len 32 from "maui-nas-03" Oct 24 12:56:19.257 UTC: Se0:1 CHAP: I CHALLENGE id 11 len 33 from "lanai-nas-01" Oct 24 12:56:19.261 UTC: Se0:1 CHAP: O RESPONSE id 11 len 32 from "maui-nas-03" Oct 24 12:56:19.273 UTC: Se0:1 CHAP: I SUCCESS id 11 len 4 Oct 24 12:56:19.281 UTC: Se0:1 CHAP: I RESPONSE id 8 len 33 from "lanai-nas-01" Oct 24 12:56:19.281 UTC: Se0:1 **CHAP: O SUCCESS** id 8 len 4
! -- Authentication is successful.
Oct 24 12:56:19.281 UTC: Se0:1 PPP: Phase is VIRTUALIZED [0 sess, 1 load]
Oct 24 12:56:19.281 UTC: **Di100 MLP: Added link Se0:1 to bundle lanai-nas-01**
! -- The link is added to the Multilink bundle. Oct 24 12:56:20.281 UTC: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:1, changed state to up Oct 24 12:56:25.221 UTC: %ISDN-6-CONNECT: Interface Serial0:1 is now connected to 81690 lanai-nas-01 Oct 24 12:56:49.117 UTC:
Se0:23 DDR: rotor dialout [priority]
! -- Third call is being dialed. Oct 24 12:56:49.117 UTC: Se0:23 DDR: Attempting to dial 81690 Oct 24 12:56:49.117 UTC: ISDN Se0:23: TX -> SETUP pd = 8 callref = 0x0065 Oct 24 12:56:49.117 UTC: Bearer Capability i = 0x8890218F Oct 24 12:56:49.117 UTC: Channel ID i = 0xA98385 Oct 24 12:56:49.117 UTC: Called Party Number i = 0x80, '81690', Plan:Unknown, Type:Unknown ... ... *! -- Output Omitted.* ... Oct 24 12:56:49.261 UTC: Se0:4 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Oct 24 12:56:49.261 UTC: **Di100 MLP: Added link Se0:4 to bundle lanai-nas-01**
! -- The 3rd link is added to the bundle. Oct 24 12:56:50.261 UTC: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0:4, changed state to up Oct 24 12:56:55.198 UTC: %ISDN-6-CONNECT: Interface Serial0:4 is now connected to 81690 lanai-nas-01 ... ...

相关信息

- AS5300 以 ISDN/异步方式拨出（出站 DDR）
- 技术支持 - Cisco Systems